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VOL. II.—16TH YEAR.

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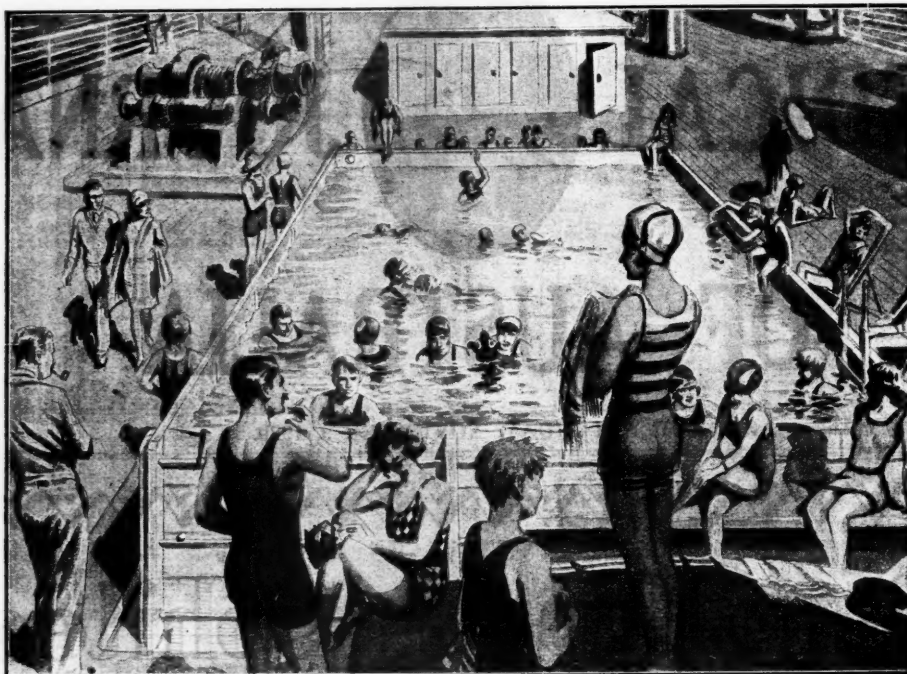
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THE OCCURRENCE OF LEAD IN THE EGG OF THE DOMESTIC HEN: AN ADDITIONAL NOTE.¹

By WILFRID B. S. BISHOP, M.Sc. (Sydney),
*Bosch Cancer Research Fellow, The University
 of Sydney,*

AND

THOMAS COOKSEY, Ph.D. (Marburg), F.I.C., B.Sc. (London),
Sydney.

(From the Department of Physiology, University of
 Sydney.)

In previous papers⁽¹⁾⁽²⁾⁽³⁾ results have been presented concerning the occurrence of lead in eggs, together with a critical review of the method employed for the estimation of the lead. Since this work was commenced, it has been suggested that lead was introduced during the estimations or that other elements contributed to the final lead value on Nesslerizing the solutions, thus leading to an inordinately high figure for lead in eggs.

At the request of the Director, Dr. H. G. Chapman, the method previously reported and still used has been reviewed and independent analyses of the material under examination made by one of us (T.C.) using another method. This paper thus presents results obtained by us and a detailed account of the check method used is given. This method depends on a reaction first reported by Ivanov, namely, the formation of a precipitate of lead with potassium metabisulphite under definite conditions. The method is very satisfactory for urine. When, however, egg material was examined by this method, the results obtained at first were not concordant and it was found necessary to introduce certain precautions in order to obtain satisfactory and reliable results.

The other method used is the same as that previously reported by one of us⁽¹⁾⁽³⁾ and will not be given again here. It may also be stated here that the presence of lead has been confirmed in that portion of the egg (the chorio-allantoic membrane) which is being studied in the Biophysical Laboratory. This work has been done by Mr. W. H. Love, B.Sc., using an X ray spectroscopic method.

Review of Method.

The method used and reported previously has been critically reviewed, particular attention being paid to the possible introduction and loss of lead. As blank determinations are relatively low and relatively constant, it does not appear probable that lead is introduced from the reagents used. The large silica basins used for ashing were examined for lead by treatment: (i) with two successive portions of ten cubic centimetres each of concentrated hydrochloric acid heating on the water bath and (ii) with two successive portions of ten cubic centimetres each of 50% ammonium acetate. The lead in these solutions was then estimated in the usual

manner, being treated exactly as an ash extract would have been treated according to the method previously given. The results are summarized in Table I.

TABLE I.

Basin Number.	Blank Milligrammes of Lead.	Net Lead in Milligrammes found after Basins had been treated	
		With Hydrochloric Acid.	With Ammonium Acetate.
4	0.01	0.002	NH
0	0.015	0.003	NH
2	0.015	NH	NH
1	0.01	NH	0.005
5	0.01	0.002	0.005

It is thus shown that as a source of lead contamination the silica basins can be disregarded.

The Effect of Copper.

The amount of copper in an egg has been shown by various authors to be about 0.09 milligramme per egg. The amount of potassium cyanide added before Nesslerizing was one cubic centimetre of 10% solution. The proportion of cyanide to copper was thus approximately one thousand to one which from a theoretical consideration of the reaction involved is greatly in excess of that required to prevent ionization of the complex cuprocyanide ions.

Iron and manganese under the conditions of the estimation, if present, would interfere with the estimation. The conditions of the precipitation as sulphide do not allow of the precipitation of iron or manganese as sulphide, while the subsequent washing of the lead sulphate precipitate would remove any of the soluble iron and manganese sulphates, if present. Neither iron nor manganese has ever been detected in the liquid from the lead sulphate washings and it does not seem probable, therefore, that these elements can be present to interfere in the final estimation.

Loss of lead is precluded during ashing by keeping the temperature below 400° C., as is also the formation of the difficultly soluble lead silicate which takes place at about 500° C..

The Material Used.

Eggs were bought at random from local shops and the well-mixed yolks and whites dried in lots of about one dozen in large silica basins in large air ovens at 105° C.. This permitted of several analyses being made of the same sample by both authors. When dry, the material was reduced to a coarse granular powder, the presence of the white with the yolk making this possible.

Various amounts of the powdered material were then taken by us for independent examination, each following his own method of ashing, extraction and estimation.

Two eggs which remained of a batch placed in water glass in June, 1927, for other purposes, were also examined independently by us, the results show-

¹ This work was carried out under the control of the Cancer Research Committee of the University of Sydney and with the aid of the Cancer Research and Treatment Fund.

ing quite close agreement and, besides confirming the results previously reported for this series of eggs, further affirm the accuracy of the method then and now employed for the estimation of lead.

Before passing to a detailed account of the method used for the check analysis, we present in Table II a summary of our results.

TABLE II.

No.	Weight in Grammes of Dry Material Used for Analysis.		Milligrammes of Lead found in Material Used.		Milligrammes of Lead per One Yolk and White.		Number of Eggs from which Sample was taken.
	By Bishop.	By Cooksey.	By Bishop.	By Cooksey.	By Bishop.	By Cooksey.	
1	14.4	20.0	0.09	0.102	0.090	0.075	11
2	12.0	20.0	0.068	0.091	0.068	0.052	14
3	14.5	20.0	0.102	0.157	0.102	0.114	12
4	Egg preserved in water glass from June, 1927.				0.086	0.080	2

Determination of the Amount of Lead in Eggs by Precipitation with Potassium Metabisulphite.

The details of the method finally adopted were the following: Twenty grammes of the dried material were incinerated at a low temperature and the heating continued until all fuming ceased. The char after powdering was heated on the water bath with five cubic centimetres of strong hydrochloric acid for some time, then a few cubic centimetres of water were added and the mixture was again placed on the water bath for a couple of hours. The liquid was filtered into a glass evaporating dish and the char washed a number of times with hot water. The char and filter paper were returned to the silica basin and heated in a muffle at a low temperature until approximately half the char was removed. The remainder was extracted with three cubic centimetres of strong hydrochloric acid and a little water as before, washing several times with hot water.

The second extract was added to the first and the whole evaporated to dryness to remove excess of hydrochloric acid. The residue was dissolved in water with the aid of a few drops of hydrochloric acid and then dilute ammonia was added until a very slight precipitate (ferric phosphate) remained, the total amount of liquid being about twelve cubic centimetres. The solution was completely saturated with sulphuretted hydrogen and allowed to stand until next day. The precipitate was separated by centrifuging (the clear liquid being kept for further treatment) and dissolved in about two cubic centimetres of dilute nitric acid (1:1) and the solution evaporated to dryness. The residue was dissolved in five cubic centimetres of water with the addition of 0.4 cubic centimetre of normal hydrochloric acid and reprecipitated as before with sulphuretted hydrogen. This second precipitation was carried out in order to separate more completely the iron from the lead.

The sulphide after centrifuging was dissolved as before in a small quantity of (1:1) nitric acid, evaporated to dryness, treated with one cubic centimetre of strong hydrochloric acid to convert into chloride and again evaporated to dryness. The clear liquid from the sulphide precipitate was again kept for further treatment.

The chloride of lead was dissolved in a few cubic centimetres of water with the addition of 0.4 cubic centimetre of normal hydrochloric acid and the solution made up to eight cubic centimetres.

Two cubic centimetres of this solution were placed in a 1.25 centimetre (half inch) test tube marked at the three cubic centimetres level and made up to that mark with water.

A number of standards in similar test tubes were prepared containing 0.005, 0.01, 0.015, 0.02 *et cetera* milligramme of lead (and in some cases intermediate amounts) in three cubic centimetres of water to which a corresponding quantity of hydrochloric acid to that in the test solutions (in this case 0.1 cubic centimetre of normal acid) had been added.

To all of these two cubic centimetres of a freshly prepared saturated solution of potassium metabisulphite were added, the tubes closed with corks and allowed to stand for at least half an hour. The density of the precipitate of the test solution was then compared with that of the standards and the lead thereby estimated.

The char after the second extraction was again returned to the muffle furnace and heated at a low temperature until practically all carbon had disappeared. The residue was dissolved in one cubic centimetre of strong hydrochloric acid and a little water. This solution was added to the two filtrates from the double sulphide precipitations and the whole evaporated to dryness and treated similarly to the previous extract again by a double precipitation. The final precipitate after solution and conversion into chloride was made up to six cubic centimetres and the lead therein estimated as previously described. When the estimation is carried out as above, any traces of copper and iron which may still be present, do not interfere with the precipitation of the lead as sulphite and are not themselves precipitated.

Analytical Results.

Of the first batch of eleven eggs, dated June 22, 1929, the dried whites and yolks weighed 162.5 grammes. The weight of dried material from one egg equalled 14.8 grammes. Material taken for analysis amounted to 20 grammes. Lead in first extracts amounted to 0.08 milligramme. Lead in filtrates and ash amounted to 0.022 milligramme. Total lead found amounted to 0.102 milligramme. Amount of lead in one egg amounted to 0.075 milligramme.

Of the second batch of fourteen eggs, dated June 24, 1929, the dried whites and yolks weighed 160 grammes. The weight of dried material from one

egg equalled 11.4 grammes. Material taken for analysis amounted to 20 grammes. Lead in first extracts amounted to 0.069 milligramme. Lead in filtrates and ash amounted to 0.022 milligramme. Total lead found amounted to 0.091 milligramme. Amount of lead in one egg amounted to 0.052 milligramme.

Of the third batch of twelve eggs, dated June 24, 1929, the dried whites and yolks weighed 174.5 grammes. The weight of dried material from one egg equalled 14.5 grammes. Material taken for analysis amounted to 20 grammes. Lead in first extracts amounted to 0.120 milligramme. Lead in filtrates and ash amounted to 0.037 milligramme. Total lead found amounted to 0.157 milligramme. Amount of lead in one egg amounted to 0.114 milligramme.

Conclusion.

From data presented in this note it is held that the method previously described by one of us does give accurate and repeatable results when applied to the estimation of lead in eggs, that lead is not introduced during the estimation either from the reagents or the vessels used for ashing and that copper, iron and manganese under the conditions of the estimation do not interfere in the estimation. Further, the conclusion reached formerly must be adhered to, namely, that eggs contain appreciable though widely varying amounts of lead.

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- ¹ W. B. S. Bishop: "The Occurrence of Lead in the Egg of the Domestic Hen, Part I," THE MEDICAL JOURNAL OF AUSTRALIA, April 12, 1928, page 480.
- ² W. B. S. Bishop: "The Occurrence of Lead in the Egg of the Domestic Hen, Part II," THE MEDICAL JOURNAL OF AUSTRALIA, January 26, 1929, page 96.
- ³ W. B. S. Bishop: "The Occurrence of Lead in the Egg of the Domestic Hen, Part III," THE MEDICAL JOURNAL OF AUSTRALIA, June 25, 1929, page 792.

THE APPLICATION OF PATHOGEN-SELECTIVE METHODS OF CULTURE IN THE INVESTIGATION OF FOCI OF INFECTION IN ARTHRITIS.¹

By C. H. SHEARMAN, M.B., Ch.M. (Sydney).
Serologist, Sydney Hospital.

It is now generally accepted that focal sepsis has some ætiological connexion with certain types of arthritis. The identification of an organism as the specific cause of the condition in any individual has always been a matter of the greatest difficulty, if not an actual impossibility, owing to the mixed types of infection encountered in the suspected foci. Indeed, the focus is often suspect rather than proven in any case and circumstantial evidence is often relied on to substantiate the relationship between it and the disease.

Any improvement in bacteriological technique that will identify a focus as being ætiologically connected with systemic disease and that will further indicate the pathogenic organism in such focus is worthy of consideration.

The method designated by Solis Cohen as the pathogen-selective method of culture or culture in the patient's whole blood is claimed to fulfil this need.

A short résumé of the observations made which led Solis Cohen to adopt the use of the inhibitory action of whole blood as selective culture media will serve to explain the rationale of the method. Sir Almroth Wright in his work on the pneumococcus some years ago had noted that blood as it issues from the capillaries has a bactericidal action on pneumococci which is not found in defibrinated or citrated blood nor in blood serum.

In 1918 Heist and the Solis Cohens when investigating immunological changes in relation to pneumococcal infection showed that pneumococci failed to grow in the whole blood of the pigeon which is naturally immune to pneumococcal septicæmia. In the blood of animals susceptible to infection by this organism, such as the mouse or rabbit, the pneumococci grew with great vigour.

They formulated the following hypothesis to cover the facts observed by them.

When small numbers of bacteria are planted in fresh uncoagulated blood, only those bacteria survive and multiply which are pathogenic for the species from which the blood is drawn.

This bactericidal action of whole blood was found by them to extend even to such organisms as *Bacillus subtilis* which failed to grow when seeded in uncoagulated blood.

This hypothesis of Heist and the Solis Cohens received confirmation in the work of Matsunami and Kolmer, who found that the whole blood of the rabbit which is naturally immune to meningococcal infection, was bactericidal to the meningococcus. Growth of this organism was, however, vigorous in the blood of the naturally susceptible mouse. Further confirmation was added by the work of Black, Fowler and Pierce who by immunizing rabbits against *Bacillus typhosus* and *Bacillus diphtheriæ* and then seeding virulent cultures of these organisms into tubes of whole blood from the same animals, concluded that "the bactericidal power of the blood thus determined is the most dependable criterion of immunity in an animal."

In 1921 Borow and the Solis Cohens showed that with increasing immunity to *Bacillus diphtheriæ* artificially produced by inoculation with killed diphtheria bacilli, a progressive development in the blood of bactericidal power to this organism could be demonstrated. The observations made as a result of investigations by these several workers may be summed up in the statement that the whole blood of an animal possesses a bactericidal action which is extended to all those organisms that at the time are non-pathogenic for the animal, but no

¹ Read at a meeting of the New South Wales Branch of the British Medical Association in conjunction with the Section of Orthopaedics and the Section of Pathology and Bacteriology on June 27, 1929.

such action is observed against organisms which are pathogenic to the animal at the time.

This fact was applied by Myer Solis Cohen in the differentiation of the pathogenic from the non-pathogenic bacteria present in any focus for any particular individual and his results were published in 1927 in a paper termed "Accentuating Pathogenic Organisms in Culture by Utilising the Inhibitory Influence of Whole Blood."

The technique adopted by him he termed the method of pathogen-selective culture. The investigation which formed the basis of his conclusions, extended over a period of seven years and embraced a series of 863 cultures made by this method.

His conclusions were as follows: (i) cultures made by the ordinary technique fail to differentiate organisms that are pathogenic for the host and hence infecting him from those that are non-pathogenic and of which he is merely a carrier; (ii) when mixed infections are present ordinary cultures may even fail to isolate the aetiological factor in an infection; (iii) in the pathogen-selective culture the patient's fresh whole blood is utilized to inhibit the growth of organisms that are non-pathogenic for him, thus permitting the free growth of those organisms that are pathogenic for him.

Solis Cohen's conclusions have been confirmed in a paper recently published in *The British Medical Journal* by Cronin Lowe. After examining by this method a series of some six hundred cultures, Lowe further concluded that it will differentiate between foci in the same patient and will indicate those which contain organisms that are pathogenic for the patient and those that are only of local infective importance; that "negative" pathogen-selective cultures suggest that the focus of infection from which the specimen was collected, while possibly requiring local treatment, is not causal of systemic infection if such exists; that the method of pathogen-selective culture is applicable only to the bacteriological examination of patients in whom some focal infection is causal of a systemic infection. It is not applicable where the condition is a purely local infection, but is essentially a means by which the selected pathogen represents the required antigen for the patient concerned.

The technique of the method has been described by Lowe and as his paper is readily accessible I do not propose to discuss it in detail. It is necessary, however, to emphasize two points. At least five cubic centimetres of fresh whole blood from the patient are necessary to which no citrate or other anti-coagulating agent must be added. The amount of inoculum used must be very small. This is important because blood varies in its bactericidal powers and because specimens used as the inoculum vary considerably in their bacterial content. For this reason I have found it advisable when making the cultures to use two separate amounts, each of five cubic centimetres of patient's blood and to vary the amount of inoculum used in each. In one three loops of an emulsion made from the specimen

to be examined and of the density described by Lowe are used as the amount of inoculum and in the other only one loop is used.

When the material to be examined is scanty, so that it is difficult to obtain an emulsion of the requisite density, as for example when cultures are made from an infected tooth apex, the number of loops full used to inoculate the blood is increased inversely with the decrease in the density of the emulsion.

By duplicating the tubes of blood one has a useful check on the method, since provided each tube gets the requisite amount of inoculum, similar results should be expected in each; nor does it add materially to the labour, since it is just as easy to withdraw ten cubic centimetres of blood as it is to withdraw five cubic centimetres from the patient.

In practice one does not always get the same cultural result from each tube, as it not infrequently happens that inhibition is prevented in the tube containing the larger amount of inoculum either because of the exceptionally high bacterial content of the inoculum or because of a low bactericidal action of the patient's blood, so that a mixed culture results. In such cases the tube with the small amount of inoculum will usually yield a pure culture of the pathogenic organism if such be present in the focus under examination.

These results obtained with the two tube method of inoculation are interesting in view of Lowe's grouping of the results to be expected in culture by the pathogen-selective method and his explanation of the phenomena observed.

According to Lowe results of pathogen-selective cultures fall into one of five groups:

1. Similarity of results in the A and B cultures, which in his series occurred in 6%;

2. A selection of more than one organism out of the many grown in the A culture (30% in Lowe's series);

3. The selection by the B culture of a single organism out of the several shown to be present in the A culture;

4. The presence in the B culture of an organism not found in the direct or A culture;

5. Failure of any organism to grow in the B culture, though many possible pathogenic organisms are present in the A culture, suggesting that as far as the bacterial content of the specimen is concerned, no organism is pathogenic to the patient.

The series of cases which I have investigated by this method, numbers 150. The technique as advocated by Lowe was followed with the majority and the results obtained were in accord with his. Since modifying the technique I have examined a further thirty cases. Though this number is too small to enable me to draw any definite conclusions, the results suggest that Lowe's first group (cases in which similar cultural results are obtained in A and B cultures) can probably be eliminated.

Further it seems that the percentage of cases falling in the second group is not nearly so high as he has found. Lowe states that similar cultural results in *A* and *B* cultures may be explained by the fact that the patient's blood is deficient in normal bactericidal power and fails to inhibit the growth of any of the organisms present, thereby suggesting the absence of general immunity.

The results obtained in my series when two tubes of blood and varying amounts of inoculum were used suggest that similarity of cultural results on the *A* and *B* cultures is met with only when a relative disproportion exists between the number of organisms present in the inoculum and the amount of blood used. It also appears that in pathogen-selective cultures it is rare to find selection of more than one of the many organisms present in the inoculum used. In only one case of the thirty examined was there a selection of more than one organism and in this two strains of streptococci differing in cultural characteristics were obtained.

When cases of arthritis were investigated by this method, the material for examination has been obtained from the following foci: teeth, tonsils, bowel, stomach, respiratory passages and accessory sinuses and occasionally the prostate, *cervix uteri* and urine. Teeth and tonsils probably are equally culpable as sites of primary infection. It not infrequently happens, however, that removal of infected teeth or tonsils has been effected at some previous date. In such cases examination of the faeces or stomach contents is carried out.

The normal stomach is regarded by Kolmer as a barrier to contamination of the intestinal tract, even though it is doubtless sometimes the site of infection not only by surface or direct infection, to which achlorhydries are particularly liable, but also by way of the blood and lymphatic channels.

A number of patients with arthritis has either an associated hypochlorhydria or a total achlorhydria. In patients I have investigated in whom a total achlorhydria existed, the bacterial content of the stomach has been unduly high. In two, however, examined recently in whom a normal free hydrochloric acid curve resulted on fractional analysis, streptococci were recovered by the pathogen-selective method, once from the stomach and once from the faeces. In the latter case examination of the stomach contents by this method yielded no growth. In regard to examination of infected teeth apices it may be thought that the method of pathogen-selective culture is unnecessary, since if due precautions are taken and an ordinary culture made immediately the tooth is extracted, a streptococcus can usually be recovered. Warren Crow has shown, however, that it is rare to find less than eight different strains of streptococci in culture from an infected apex, while as many as sixteen have been recovered. It would hardly be logical to assume that all these strains are equally culpable in producing arthritis in view of the selective action of various strains of streptococci and the aetiological connexion, if any, would still remain in doubt.

Since using the two tube modification, I have found that the organism recovered in culture from patients with arthritis are of two types only, either a streptococcus or a small Gram-positive diplococcus. It must be remembered that this series is too small to be taken as a general statement. *Bacillus coli* has appeared only on very rare occasions and then would usually be attributed to disproportion between the number of bacteria in the inoculum and the amount of blood used. It has frequently happened when two tubes of blood were used with varying amounts of inoculum in each, that the tube inoculated with the smaller quantity yields a pure culture of a streptococcus, while the other yields a mixed culture, including *Bacillus coli*. It must be remembered that the number of colon bacilli present in faeces greatly exceeds the number of streptococci. As there must be a limit to the number of organisms on which the bactericidal power of a definite quantity of blood can be exerted, it is obvious that if too much inoculum is used, for example, when faeces are under investigation, a culture of colon bacilli will result. That the streptococci recovered from the *B* culture owe their survival to mass inoculation is not a tenable hypothesis. Relatively to the colon bacilli present, streptococci are so rare that with the small amount of inoculum used one frequently fails to find a single colony of this organism on the *A* or ordinary culture. Solis Cohen drew attention to the fact that the ordinary culture may fail to show the aetiological factor in an infection, though the *B* culture may show it. He suggests that either it is outgrown by the more luxuriant non-pathogenic organisms present in the ordinary cultures or that the inhibition by the patient's blood of such non-pathogens has actually encouraged the growth of the pathogenic organisms which are thereby readily recognized. The streptococci isolated by this method have almost without exception proved to be of the non-haemolytic type, only one haemolytic organism having been recovered in the series. In one patient from whom a haemolytic streptococcus had been recovered from the faeces by ordinary culture methods, a non-haemolytic type was later recovered by pathogen-selective culture. The small Gram-positive diplococcus which has been found on several occasions, never forms chains on solid media. The colonies are more opaque than those of streptococci and the growth more vigorous on ordinary agar, though never as vigorous as a staphylococcus. For purposes of differentiation I call this a *deformans* type of organism, though it does not conform to the characteristics of *Micrococcus deformans* described by Crow. One strain of this organism proved to be haemolytic.

Though the method of pathogen-selective culture appears to be based on sound principles of immunity, the question might well be raised as to whether such organisms as survive passage through the patient's blood, do not do so through some inherent quality of the organism rather than as the result of a process of immunity. Control tests in a large

number of cases in which blood from apparently healthy people was inoculated in parallel series with that of the patient investigated and with the same amount of inoculum, have failed to show one instance in which the organism, ultimately recovered through the patient's own blood, was able to resist the bactericidal effect of healthy blood. Incubation of the patient's blood without the addition of inoculum also has failed to yield a growth of the organism.

It would appear then that a pathogen-selective culture occurs from any focus in an individual only when there is a specific change in the relationship between his blood and one or rarely perhaps more organisms in the focus, whereby the natural bactericidal power of his blood for that organism, as demonstrable *in vitro*, is diminished.

Such loss of bactericidal power would indicate increased pathogenic activity of the organism for the individual concerned. Since in arthritis suspected foci when examined by ordinary culture result in mixed types of growth from which the aetiological agent may well be absent, the method of pathogen-selective culture is recommended for investigating such foci.

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SOME PRINCIPLES UNDERLYING THE DIAGNOSIS AND TREATMENT OF FOCAL INFECTIONS WITH PARTICULAR RELATION TO ARTHRITIS.¹

By R. V. GRAHAM, M.D., Ch.M. (Sydney), F.C.S.A.,
Honorary Assistant Orthopaedic Surgeon, Lewisham
Hospital; Honorary Demonstrator, Department
of Anatomy, University of Sydney.

So much has been written on the subject of focal infection in relation to arthritis that it is impossible even to traverse the literature in the time at our disposal tonight. The fact that attention is concentrated on the infective factor concerned does

not imply that there may not be many other factors of almost equal importance. The infective factor is, however, of sufficient importance to warrant further study. I feel that recent methods are of assistance in diagnosis and treatment and put them forward tonight in the hope that they will stimulate further work. If they fail to survive later experience, their use cannot at any rate fail to increase our knowledge of the various conditions concerned in these infections.

It has been known for a long time that certain organisms have a tendency to localize in the tissues of man. This frequently happens as a sequel to an acute infection like typhoid fever or pneumonia and in such cases the causative organisms show a special predilection for certain tissues.

Bacteriemia or the presence of organisms in the blood stream without any obvious or severe disturbance of the general health has been frequently recognized.

Crowe,⁽¹⁾ quoting the *Annals of the Pickett Thomson Research Laboratory*, noted this characteristic of streptococci and during the pneumonic influenza epidemic pneumococci were occasionally found in blood cultures from apparently convalescent patients.

Nickel and Sager,⁽²⁾ of the Mayo Clinic, injected silver nitrate into the tissues in order to traumatize them aseptically and then injected bacteria intravenously. They concluded that when bacteriemia is present, these organisms may infect an area of devitalized tissue, even if they are of low virulence and have an elective affinity for localization in a special organ or tissue.

Similar results were obtained by Bullock and Cramer⁽³⁾ who used calcium salts.

Weston Price⁽⁴⁾ found that streptococci from an infected tooth showed a predilection for fibrous tissue in a case of recurrent acute torticollis relieved each time by extraction of an infected tooth.

This tendency to localize is responsible for the part frequently played by these organisms in focal infections, their virulence being low, but their viability being great.

Zinsser⁽⁵⁾ found that toxins also tend to have a selective action on certain tissues, particularly if the toxin has been elaborated as a result of bacterial action in the tissues of the patient. If such tissue be mixed with the toxin before injection, the ill effects of the latter are neutralized. But in the case of animals insusceptible to that toxin, although combination occurs between it and the susceptible tissue, the toxin is not neutralized.

Horder⁽⁶⁾ considered the fibrous sacs formed at the apices of infected teeth to be typical of the reaction produced by many streptococci and analogous to the tissue response evoked by their presence.

Coombs⁽⁷⁾ found that streptococci excite the tissues to a reaction which is more formative than exudative, and have a predilection for the reticulo-endothelial system. Various workers have isolated

¹ Read at a meeting of the New South Wales Branch of the British Medical Association in conjunction with the Section of Pathology and Bacteriology on June 27, 1929.

streptococci from the exudate in chronic arthritis and many have cultivated them from the blood of patients suffering from so-called rheumatic disease.

Weston Price,⁽⁴⁾ of Cleveland, has made an intensive study of focal infections and has experimental and clinical data from which he concludes that the infecting organism is responsible for blood and tissue changes of a very diverse character, unless it is walled off by a local reaction.

He found one of two typical changes after implanting infected teeth beneath the skin of the abdomen in rabbits: (i) The tooth became surrounded by a highly vascular defensive membrane which constituted an efficient local quarantine, or (ii) a series of changes followed, of which the chief were a diminution in the polymorphonuclear leucocytes, an increase in the small lymphocytes, an early increase but later a reduction in the amount of active calcium and often of the total calcium in the blood, increased sensitiveness of nervous reflexes, convulsions and death if the calcium level fell below five to six milligrammes per hundred cubic centimetres of blood. He also investigated these conditions in 1,600 patients and found precisely similar results correlated with infections at the apices of teeth. He found that changes in the calcium level assist in classifying them into three groups, according to their relative liability to suffer from various focal infections.

Those with a high blood calcium have a high resistance to focal infection and tend to show local decalcification about an infected tooth. Those with a high total but low active calcium have an area of condensing osteitis surrounding an area of rarefaction and this corresponds to an immunity more or less in the balance. Those with a low total and low active calcium show relatively little reaction compared with the amount of infection and this group has an inherited susceptibility to various infections. The blood of these groups possesses corresponding grades of bactericidal efficiency for streptococci.

The reduction of calcium ions in the blood affects the whole organism and has far-reaching effects on heart, blood, bone, nervous and connective tissues which easily constitute the most serious expression of focal infections.

The phenomena associated with focal infections are essentially vascular in nature in the early stages. Permanent and irrevocable changes like fibrosis and the formation of osteophytes are liable to follow later. The factors contributing to these vascular changes are intimately connected with the various reactions of the host to the invading organism and they find their greatest expression in the vicinity of the blood supply.

Dilatation of the skin capillaries and of the arterioles is the normal response to cold, the skin becoming warm and red.⁽⁸⁾ Circulating toxins have the same effect on the arterioles and capillaries as histamine; they cause contraction of arterioles and dilatation of capillaries, thus producing a state of stasis which causes a local asphyxia, resulting in

devitalization of the tissues. The normal impermeability of the capillary walls to protein is diminished or lost and fluid leaves the vascular system. The oxygen in the blood is consumed before it can be replaced by a fresh supply. These circulatory phenomena will be most evident when the collateral blood supply is poor; such conditions rule wherever fibrous tissue predominates. The oedematous fibrous tissue is very easily torn by traumata which would be harmless to healthy tissue.

Leriche and Policard⁽⁹⁾ claim that many traumata are so comparatively insignificant that they leave no visible signs, yet may be followed by serious vasomotor disturbances in the fibrous tissues. The fibrous tissues and joints feel the effect of vasomotor changes more than other tissues because their blood supply is relatively poor and is unable to respond rapidly to changes resulting from alterations in the blood supply of adjacent parts.

The *circulus vasculosus articuli* which supplies the articular surfaces of joints, is a rich network of blood vessels in the transition area between synovial membrane and cartilage and it sends off end arteries beneath the cartilage; such a vascular system is poor in anastomoses and cannot easily and rapidly respond to demands for increased blood supply.⁽¹⁰⁾

Adami showed that the uncontrolled action of the sympathetic after section of the vasodilators hinders or prevents the manifestation of the ordinary processes of inflammation and by preventing destruction of the irritant favours necrosis of tissue.⁽¹¹⁾

Such vascular phenomena are associated with the action of streptococci in man and many of the secondary effects depend on the pathological changes resulting from their action. These vascular phenomena may gradually disappear, resulting in return to a normal circulation in the affected tissues. But if the irritant continues or if the embryonic connective tissue be subjected to frequent traumata in the shape of excessive or misguided movements, they are very apt to be followed by fibrosis or ossification, together with ulceration of cartilage in the case of an articular surface. These conditions constitute the causative factors of most of the crippling deformities associated with these infections. Contraction of fibrous tissue strangles the blood vessels and impedes movement. Osteophytes also prevent normal movements and so assist in preventing adequate nutrition of the fibrous and articular structures.

Hartwell,⁽¹²⁾ after studying the processes of repair in surgical wounds in human beings, concluded that the macrophages are the true fibroblasts; they are derived from lymphocytes which develop rapidly by ingestion of fat; fat tissue is the place for and the basis of production of new collagenous material in wounds of human beings; the fundamental healing process is the same in clean and infected wounds.

Stump⁽¹³⁾ showed that fat cells are really reticular cells which still retain the pale vesicular

ILLUSTRATIONS TO THE ARTICLE BY J. BERNARD DAWSON.

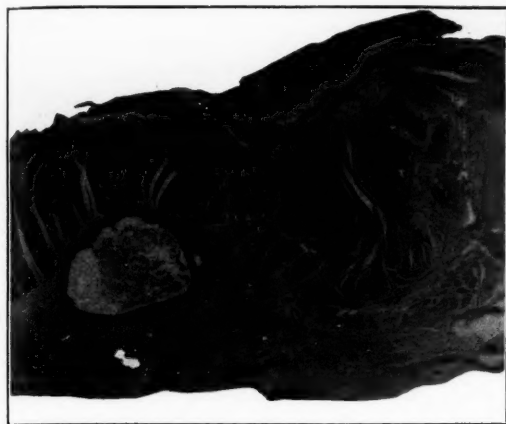


FIGURE I.
Low Power View of Section, showing subserous endometrial cyst with two endometrial tubules (on the left) invading longitudinal muscle layer of sigmoid colon.

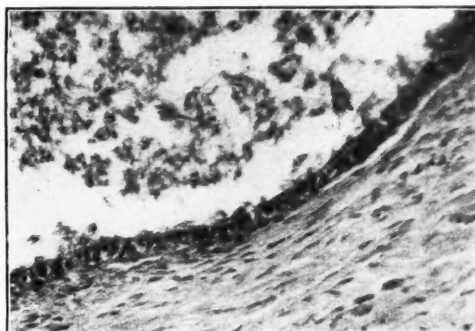


FIGURE II.
High Power View of Wall of Endometrial Cyst showing slightly flattened columnar epithelium and contained blood debris.

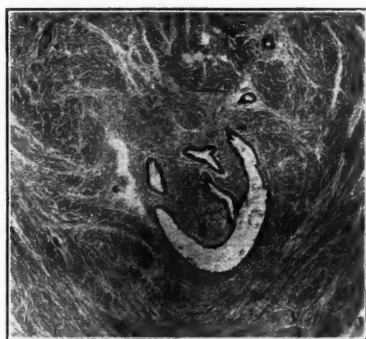


FIGURE III.
Section showing endometrial tubules invading longitudinal muscle layer of sigmoid colon.

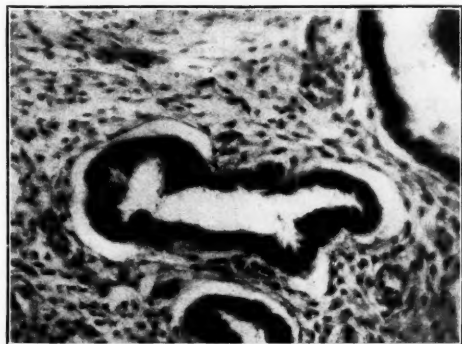


FIGURE IV.
High Power View of Endometrial Tubules in Longitudinal Muscle Layer of Sigmoid Colon, showing columnar epithelium and typical stroma.

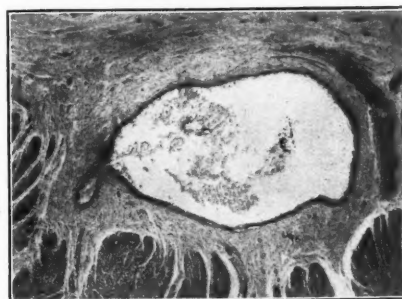


FIGURE V.
Section showing proliferation and invasion by budding at left hand pole of endometrial cyst.

ILLUSTRATIONS TO THE ARTICLE BY R. V. GRAHAM.

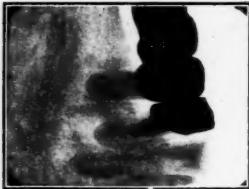


FIGURE I.
Two teeth showing apical
rarefaction: *B* culture tubes
yielded no growth.



FIGURE II.
Tooth showing condensing
osteitis: *B* culture, pure
streptococci



FIGURE III.



FIGURE IV.
Skiagram of tooth showing
apical rarefaction surrounded
by area of condensing osteitis.
B culture, pure streptococci.

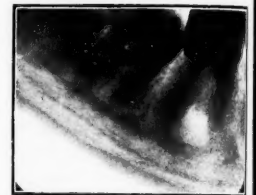


FIGURE V.
Apical rarefaction. *B* culture
tubes, no growth.



FIGURE VI.



FIGURE VII.



FIGURE VIII.

nucleus of undifferentiated mesenchyme, and his work demonstrates that the source of new fibrous tissue is the reticular connective tissue between the fat cells. He has produced evidence to prove that undifferentiated mesenchyme is a tissue of many developmental potentialities. It may produce connective tissues, fibrous tissue, synovial membrane, cartilage, bone or stem-blood cells, but once it departs on a given line of differentiation, its developmental fate is sealed. Thus fully formed fibrous tissue cannot develop into bone. New bone arises from the undifferentiated connective tissue represented by the reticulo-endothelial cells which are universally distributed through adult tissues, if the necessary mechanisms associated with sluggish circulation and a maximum concentration of calcium salts are present. These reticulo-endothelial cells are in protoplasmic continuity with the endothelium of the capillaries. Thus osteophytes form, not because of the juxtaposition of bone, but because of the presence of the same factors which originally contributed to the formation of bone in the embryo. The circulatory conditions in the *circulus vasculosus articuli* are most favourable for ossification in the later stages of a chronic infection, where lime salts have been dissolved from the adjacent bones and there is a passive hyperæmia in the adjacent tissues.

Dawson and Struthers⁽¹⁴⁾ showed that decalcification of bones or teeth may occur in one of three ways: (i) Halisteresis; in some dystrophies they have found bone absorption without osteoclasts; (ii) normal lacunar erosion; (iii) the penetrating vessels may play some part, their share depending on the modifications in the reconstructions necessitated by the mechanical influences of strain and pressure.

Collip⁽¹⁵⁾ showed that the blood calcium level may be increased by injection of parathyroid extract from 10.5 milligrammes per hundred cubic centimetres to twenty milligrammes per hundred cubic centimetres, which is therefore primarily a calcium mobilizer.

The carbon dioxide retained in the hyperæmic tissues as a result of the venous stasis interferes with the metabolism of the bone cells and prevents them absorbing calcium.⁽⁸⁾ Chemical analysis often reveals an increased amount of calcium in the tissue fluids under these conditions. Experimental injection of calcium results in its deposition in lungs, stomach and kidneys, in those situations where acid is secreted and where as a result the reaction of the tissues tends to be alkaline. In the case of the urine this leads to the removal of calcium from the body and thus an actual shortage of calcium may occur; the greater the acidity of the urine, the greater amount of calcium is lost.

Loew⁽¹⁶⁾ has shown that there is sometimes an increase in total blood calcium in osteomalacia. If the reaction of the tissues becomes more alkaline as a result of the circulation of blood with calcium in maximum concentration, the acidity of the secretions and excretions by stomach, kidney and lungs is decreased.

Corlette⁽¹⁷⁾ has concluded that deprivation of calcium leads to dilatations in various portions of the alimentary tube and this factor together with the loss of the normal gastric secretions mentioned by McCarrison⁽¹⁸⁾ probably plays a large part in the intestinal toxæmias.

Mellanby⁽¹⁹⁾ has demonstrated a definite relation between dental caries and deficiency of vitamin D in the diet and Green and Mellanby⁽²⁰⁾ have shown the close relationship between vitamin A, contained in cabbage, cod liver oil, butter, egg yolk, milk and resistance to infection.

Ætiology.

The multiplicity of theories about ætiology is sufficient proof that no one is entirely satisfactory, but suggests that they arise from the fact that different factors obtrude themselves at different times. Thus Hurst⁽²¹⁾ considered that the absence of free hydrochloric acid was the causative factor, but Coates and Gordon⁽²²⁾ found hyperchlorhydria associated with some forms. Kauntze⁽²³⁾ in Kenya Colony found that the serum of a large number of arthritic patients agglutinated coliform organisms isolated from their own stools and Lane⁽²⁴⁾ considered that the large bowel should be short circuited in every patient with rheumatoid arthritis in whom simple means had failed, but Mutch⁽²⁵⁾ found streptococci in the duodenum after laparotomy on people with arthritis. Some workers thought the joints became sensitized to streptococci, but others have failed to confirm this idea. Maxwell Penny⁽²⁶⁾ found organic lesions in the central nervous system sufficient to correspond with many of the symptoms observed, but thought the *fons et origo mali* had still to be sought in those tissues or viscera where toxins may be manufactured. Nathan⁽²⁷⁾ thought that all the nerve symptoms were due to a peri-arthritis of the vertebræ which he induced in dogs by the injection of living organisms. Other workers considered that the symptoms were due to the accumulation of lactic acid, products of protein metabolism *et cetera*. Some found a lowered sugar tolerance which was roughly proportional to the activity of the arthritic process. But it is as difficult to classify these conditions on the basis of their ætiology as it is to do so on a clinical basis. Descriptive terms have multiplied to such an extent that endless confusion has been created and even Crowe who attempted to simplify them, had to include a "mixed arthritis" to include conditions with features common to osteoarthritis and rheumatoid arthritis. The pathological conditions underlying them are essentially the same in the early stages and are modified only according as they regress or progress through fibrosis or ossification to complete or partial fixation.

A patient with arthritis does not produce osteophytes as an initial lesion; the classification of his affection as an osteoarthritis would therefore depend entirely on the stage at which he was examined.

For these reasons no effort has been made to classify the patients who are the subject of this

paper. It would seem preferable to use the pathological condition as a basis for classification if it were possible to determine it at any given time.

Rolleston⁽²⁸⁾ in a review of focal infections concluded that the low sugar tolerance, the endocrine disturbances and the lowered metabolism could all be explained as effects of an underlying chronic infection rather than primary causes of the condition. Nathan⁽²⁹⁾ in 1917 showed that there was always to be found an inflammatory stage in chronic arthritis which would be followed by resolution or by subsequent degeneration; in any affected joint these stages could be found side by side, so that the actual clinical picture depends on the chronicity of the process and the area where it has started.

Diagnosis.

For the purpose of this discussion I assume the existence of a focal infection, whether it be a neuritis, fibrositis, myositis or arthritis matters not. As teeth are so commonly infected, the first step in the diagnosis necessitates an X ray examination. It is obviously possible that dental infection may be present without any demonstrable changes in the skiagram; such cases cannot enter into consideration at this juncture. Those skiagrams showing abnormal appearances fall naturally according to their pathological basis into three classes: (i) Those depicting rarefaction of bone at the apex of a tooth, (ii) those revealing increased density, due to an increased deposit of lime salts or to osteosclerosis, (iii) a combination of (i) and (ii), that is an area of rarefaction surrounded by an area of increased density which insensibly merges into the surrounding bone.

Many pathological examinations have been made of teeth showing apical rarefaction and in many cases they have been sterile. But frequently streptococci have been isolated; vaccines prepared from these organisms have met with varying degrees of success in the treatment. Crowe stated that from eight to sixteen varieties of streptococci may be present in such areas. The outstanding difficulty has been to decide which strain, if any, was pathogenic for the particular individual under consideration.

An article by Dr. Cronin Lowe, of Liverpool,⁽³⁰⁾ focused attention on a method of examination which was based on work by Solis Cohen ten years previously. Lowe quoted results of 600 examinations and was of opinion that the method was of value in deciding whether a given organism was pathogenic

for an individual at the time of the examination. The method has been described by Dr. Shearman and I need not recapitulate it.

The cultures on ordinary media are called *A* cultures and those on the patient's whole blood are called *B* cultures throughout this paper.

Ramsay and Pearce⁽³¹⁾ applied it to the examination of tonsils and found streptococci in 111 out of 158 examinations. They stressed the necessity of making separate punctures of each tonsil, as the organisms were frequently grown in the *B* culture from one side and not from the other. This method has been applied to the examination of teeth removed on suspicion of being infected and at present our impression is that it has been distinctly valuable in many cases.

Weston Price regards "condensing osteitis" around the apex of a tooth as the correct criterion for its removal as a source of apical sepsis. Figure I is the skiagram of some teeth of a patient suffering from brachial neuritis causing paralysis of his deltoid muscle. The two teeth were removed; "*A*" cultures yielded streptococci and staphylococci; "*B*" cultures were sterile. He failed to improve and one month later the tooth depicted in Figure II was removed. Note the absence of rarefaction at the apex. Streptococci in pure culture were obtained in *B* tubes and the administration of a vaccine from this culture was followed by progressive improvement.

The next illustration (see Figure III) shows a very interesting condition. The patient had a spinal fusion performed one year previously for tuberculous spondylitis. He improved rapidly and resumed his arduous occupation. About eight months ago root pains referred to the affected area reappeared and a return of his original trouble was suspected. Skiagrams taken at frequent intervals failed to disclose any reason for further interference with his spine. His teeth were examined by X rays and the tooth shown in Figure IV was removed. Note the condensation around an area of rarefaction, interpreted by Weston Price as a "breaking resistance" to infection. Such an interpretation exactly coincided with this man's clinical condition. "Pathogen selective" cultures (*B*) made from the tooth revealed streptococci in pure culture. He was given vaccine prepared from this culture and improved so well that he enjoyed a 250-mile motor car trip during the Christmas holidays and has since been doing his full work without any symptoms and has remained well for six months.

Many patients have already lost their teeth or tonsils and other naso-pharyngeal foci have been treated when they report with persistent neuritis, fibrositis or arthritis; or an X ray picture may show no reason for interfering with their teeth. In these people it is common experience to find streptococci or other organisms in "*B*" cultures from their faeces. Albee,⁽³²⁾ Osgood, Allison⁽³³⁾ and many other observers have found the causes of many previously obscure infections in the faeces and now insist on a

TABLE I.
Summary of Bacteriological Findings.

	B+	B-		A	B	
Faeces	47	19	Staphylococcus	37	20	A+B+72
Tonsils	5	2	Streptococcus	60	45	A-B-13
Nose	5	0	<i>Bacillus coli communis</i>	44	14	A+B-17
Teeth	19	12	Gram-positive bacilli	5	—	A-B+5
Urine	4	2	<i>Micrococcus catarrhalis</i>	5	—	B Pure 70
Cervix	0	3	<i>Bacillus lactis aerogenes</i>	2	2	B Mixed 7

routine examination of the faeces in such cases as fibrositis, sacro-iliac strain, flat feet, "tennis elbow" and in fact any conditions where fibrous tissue shows signs of inflammation. The Gram-negative flora are greatly reduced and the Gram-positive greatly increased; histamine, mucus and acid constipated stools are frequent, although Crowe found constipation present in only 40% of bowel infections with focal symptoms. Albee finds it rarely necessary to resort to bony fixations for sacro-iliac strain. Keating⁽³⁴⁾ discovered streptococci in the stools in over ninety arthritides and Mutch⁽³⁵⁾ has found streptococci in the intestine in Still's disease and in the duodenum after laparotomy in many arthritides. When dental or tonsillar sepsis coexists with bowel infection, it is usual to find achylia or very diminished hydrochloric acid in the test meal.

Treatment.

Treatment of these infections should be planned to improve the blood supply by removing the vaso-constriction of the arterioles supplying the affected tissues. This requires adequate surgical drainage of the focus as a preliminary to any further treatment. In the dental infections this frequently implies removal of the offending tooth which is often sufficient to clear up the infection.

Figure V illustrates a skiagram of a tooth from a patient who had severe subacute arthritis of both shoulders for many months; removal of this tooth was followed by rapid improvement. The "A" cultures contained streptococci, "B" cultures were sterile; he received no vaccine and has made a perfect recovery.

Figures VI, VII and VIII are reproductions of skiagrams from a patient who had a chronic staphylococcal abscess in her radius of fourteen years' duration with typical symptoms. It was trephined, swabbed with spirit and smeared with bismuth-iodoform-paraffin paste. Note the area of osteosclerosis surrounding an area of rarefaction. This condition exactly corresponds with the Class II in Weston Price's classification of diseased teeth. The third skiagram, taken one year after operation, shows complete regeneration of bone which has persisted to the present time. The results obtained by this treatment of such bone infections indicate that further work on the conservative treatment of infected teeth is desirable. But in many instances the treatment or removal of a focus is not sufficient to insure a return to full health.

The graph illustrates a comparison between results obtained in the treatment of focal infections: (a) Removal of focus but no subsequent treatment with vaccine (Meisser and Brock);⁽³⁶⁾ (b) removal or treatment of focus followed by vaccines (obtained from cultures on Crowe's chocolate medium) injected subcutaneously (Crowe);⁽¹⁾ (c) removal or treatment of focus followed by intravenous injections of vaccine prepared only from organisms surviving cultures on the patient's whole blood (present series). Meisser and Brock's figures

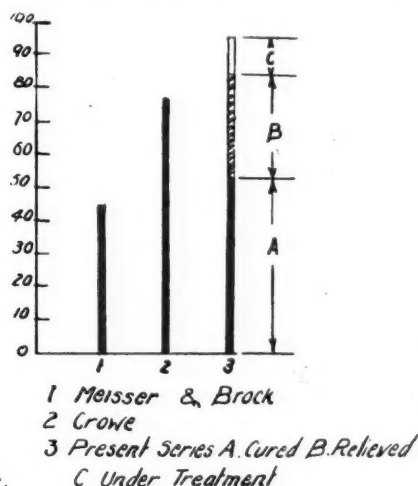
include those cured or relieved. Crowe's figures include those cured or relieved.

My figures include among the cured (57%) only those who were able to resume their previous occupation, free of symptoms and with perfect function after twelve intravenous injections of a vaccine prepared from organisms growing on their whole blood after inoculation with material from the focus under examination. This was a purely arbitrary standard of cure, adopted for the purpose of assessing the value of vaccine in the treatment of such conditions.

The relieved class (26%) includes those who needed some further treatment ancillary to vaccines in order to attain the standard of cure. Of those under treatment (11%) some will certainly be added to the cured or relieved class.

Vaccines will not remove fibrous tissue or osteophytes, but their effect is very definite in relieving the effects of vaso-constriction before these permanent tissue reactions have occurred. Even after the formation of these osteophytes patients experience a definite feeling of well-being after treatment with vaccines on the lines indicated in (c), which first manifests itself as an ability to sleep without sedatives.

Many patients are exceedingly sensitive to vaccines prepared in this way and it is necessary to give very small doses to avoid harmful reactions. Every endeavour was made to avoid protein shock effects or any other untoward reactions; vaccine was administered on the same principle as that underlying the use of small doses of serum for avoiding anaphylaxis in persons sensitive to that serum.



GRAPH I.

Active use of the inflamed tissue was encouraged as soon as the acute symptoms had settled down; the vaso-dilatation following such use improves nutrition and stimulates repair. This vaso-dilatation is also produced by the intravenous injection of vaccine. Brown⁽³⁷⁾ used this fact as a means of

determining the diagnosis between Raynaud's disease, arteriosclerosis and *thrombo-angiitis obliterans*.

About ten years ago Bezredka⁽³⁸⁾ formulated his theory of local immunity which is fully explained in his latest book.⁽³⁹⁾ Briefly, he believes that immunity to any infection is a function of the tissue characteristically infected and the degree of immunity bears no relation to the amount of demonstrable antibodies in the serum. This immunity is assured by the leucocytes and the reticulo-endothelial system which contains the fixed phagocytes and has a special affinity for certain viruses. He regards the process as being analogous to that which occurs when agglutinable bacteria lose their affinity for an agglutinating serum if they have previously been in contact with some of the same serum heated to 75° C.. He shows that the virulence of an organism varies according to the species of animal infected, but also according to the tissue infected in the individual animal. Thus, anthrax is very virulent for the guinea-pig if injected into the skin, but if injected into the peritoneal cavity the same strain is innocuous, being taken up by the leucocytes like any other saprophyte. Pigeons are insusceptible to anthrax, yet the bacilli live in their internal organs until destroyed by the leucocytes.

Matsumoto⁽⁴⁰⁾ showed that 0.25 cubic centimetre of antianthrax serum protects a rabbit if given subcutaneously, but two cubic centimetres given intravenously fail to prevent a fatal septicaemia.

Bezredka⁽³⁹⁾ concludes from many experiments quoted that if the vaccine is brought into the body by the same path as that followed by the virus in its penetration, the vaccine comes into direct contact with the healthy cells which are receptive or sensitive to that virus and renders them invulnerable. He quotes many results of the oral vaccination of troops against typhoid and dysentery, showing the great protection afforded by this method. During the past ten years I have seen similar beneficial effects following the intranasal application of vaccines for infections of the upper respiratory tract.

Stump⁽¹³⁾ has shown that the reticulo-endothelial system is in protoplasmic continuity with the endothelium of the formed capillaries and so it is logical to introduce the vaccine intravenously if one is dealing with an infection to which that system is susceptible. It has already been pointed out that the dose should be a desensitizing one.

So many writers have shown that there is a deprivation of calcium in these chronic infections that every effort should be made to promote calcium retention. Loew⁽¹⁶⁾ has shown that this end is more easily attained if the alkalinity of the plasma is relatively high. The sodium and potassium salts of inorganic acids, such as malic and citric acid contained in leaves, roots, tubers and fleshy fruits, are particularly valuable in this direction. He also points out that sodium citrate in milk assists the infant to retain calcium.

If drug treatment is required, sodium-calcium lactate is of greatest value. Calcium chloride in large doses causes acidosis. Mellanby⁽¹⁹⁾ and Mellanby and Green⁽²⁰⁾ have shown the value of vitamin D and vitamin A in the diet for these conditions. Their work should be consulted for a more detailed discussion. Collip⁽¹⁵⁾ has pointed out the danger of using parathyroid extract to increase the blood calcium content, as it merely mobilizes the calcium contained in the tissues. Proteins and fat should be limited, if there is deficient calcium retention; carbohydrates should also be restricted in those cases exhibiting a lowered sugar tolerance.

Massage, diathermy and ultra-violet light have each a place in the treatment of these infections. In severe and prolonged cases of arthritis where permanent changes have taken place, much relief follows sympathectomy; the resulting vaso-dilatation has been shown to persist for over three years. Royle⁽⁴¹⁾ and Rowntree and Adson⁽⁴²⁾ and Leriche⁽⁴³⁾ have each described very successful results from this operation.

Conclusions.

1. Some traumata of fibrous tissue produce their characteristic effects by assisting circulating organisms to localize in that tissue.
2. It is impossible in the present state of our knowledge to say positively from an X ray examination that a given tooth is or is not an active source of focal sepsis.
3. Teeth showing osteosclerosis without rarefaction and *vice versa* have yielded streptococci growing on the patient's whole blood.
4. The mere presence of an organism in a focus does not warrant the assumption that it is pathogenic for that patient.
5. Pathogen-selective cultures are of value as an aid to diagnosis of the activity of a given focus.
6. Patients are very sensitive to such vaccines and only small desensitizing doses should be given.
7. The calcium metabolism shows definite and characteristic changes in these infections.
8. Vaccines prepared from positive cultures on patients' whole blood have been of value in treatment after eliminating the primary focus.
9. The pathogen-selective method is worthy of trial in other conditions attributed to focal infection.
10. Early treatment is necessary in order to avoid formation of osteophytes and fibrous tissue.

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THE TOXICOLOGY OF THE ARUM LILY AND CUNJEVOI LILY.

By JOHN MACPHERSON, M.A., B.Sc., M.B., Ch.M. (Sydney),
Lecturer in Pharmacology, Materia Medica and
Therapeutics, University of Sydney.

AT the inquest recently held on the death of a child after eating some "root" of an arum or cunjevoi lily expert witnesses attributed death to the irritation of the mouth and throat by the needle-like crystals of calcium oxalate with which the plant abounded. This explanation seems to me utterly erroneous. Calcium oxalate, although sometimes its passage in the urine may give rise to pain and hæmaturia, is relatively innocuous and inert. In fact the treatment of oxalic acid poisoning is best effected by administering chalk, whiting, lime-water or some soluble calcium salt as a chemical antidote to precipitate the insoluble calcium oxalate. Many articles of food, such as grapes and strawberries and wines, contain considerable amounts of oxalates, frequently in the form of the much more active and irritating potassium oxalate. Rhubarb leaves contain this compound in a percentage varying from 0.3 to 1.1 and death has followed the excessive consumption of these leaves. Stock fed on plants containing excessive amounts of oxalates, such as rhubarb and sorrel (*Rumex* and *Oxalis* species), have not exhibited manifestations of acute irritant poisoning, but the totally different symptoms of calcium deprivation, due to the precipitation of their body calcium in combination with the oxalate as insoluble calcium oxalate. The arum lily and cunjevoi both belong to the arum family or *Araceæ*. All parts of these plants—the so-called "root" (really an underground stem, rhizome, tuber or corm), the stem, petiole, leaf and inflorescence—contain an intensely acrid and irritant poisonous principle which is volatile and soluble in ether. It has been suggested that this principle is a volatile alkaloid, but I am not certain as to whether it has been definitely determined. It is dissipated by drying and heat. This was the constituent, doubtless, which caused the child's death. Other substances obtained have been starch, sugar, gum, albumin, resin, fat, saponin, much calcium oxalate and extractives. The vegetable drug known as "Tonga," from the islands of the Pacific Ocean, consisted of two or three plants, one of which, *Rhaphidophora vitiensis*, belonged to the *Araceæ*. The scraped stem which formed portion of the drug, contained prismatic raphides, potassium chloride, starch (like arum starch) and a volatile alkaloid, "Tongine." The drug was vaunted as a specific

for neuralgia. A preparation of *Arum maculatum* has likewise been employed for this infirmity. Starch was formerly prepared from *Arum maculatum* on the island of Portland on the south coast of England and used as "Portland arrowroot." *Arum triphyllum* is the "Indian turnip" of North America. Its fresh juice may cause vesication, if applied to the skin. If the corm be masticated, it gives rise to a burning, acrid taste in the mouth and fauces. In a partially dried state the corm has been used for flatulence, colic and chronic bronchitis. Powdered and mixed with honey or syrup, it has seemed beneficial in aphthous stomatitis. An ointment has been made by stewing the fresh corm with lard and beneficially employed for ringworm and other cutaneous disorders. *Richardia (Calla) arthropica*—a well known ornamental plant—has likewise an acrid farinaceous tuber. *Monstera deliciosa* is another member of the arum family, curious in the development of aerial roots. Its perfectly ripe fruit is delightful, but its consumption may cause allergy or anaphylaxis in the form of rapidly developing and extensive urticaria. The unripe fruit is intensely acrid. *Acorus calamus*, known as calamus or sweet flag, indigenous to North America and northern Asia, extends also to central Asia, India and Europe. The rhizome has an agreeable aromatic odour and contains from 1.5% to 2.5% of volatile oil. The rootlets have very little of this volatile oil, called *oleum calami*. It contains a resin-like body, acoretin, and a bitter principle, acorin. Taken internally calamus rhizome excites a sensation of warmth in the stomach and improves appetite and digestion. It quickens the pulse and increases the quantity of urine and perspiration. Excessive doses give rise to headache. It has been employed for flatulent and atonic dyspepsia and intestinal colic, also for various "coughs" and as a mild stimulant in the "typhoid state." *Colocasia*, of the arum family, has two species, *Colocasia esculenta* and *Colocasia antiquorum*, which are cultivated in tropical and subtropical countries under the name of "coco" and "eddoes." The thick, starchy rhizome, like that of the arum lily itself, in a fresh condition contains a more or less acrid juice which is removed by cooking. It is used as a food like a yam. Finely chopped up, tied in a cloth and heated, it forms a domestic poultice for rheumatism. *Colocasia antiquorum* is indigenous to Queensland, extending through the Malay Archipelago to India. The acrid juice of the petioles of the different varieties of this species constitutes a domestic remedy in India on account of its styptic and astringent properties. It is said even to arrest minor arterial hæmorrhage and to cure otorrhœa. For these purposes the petiole is slightly roasted and its juice expressed.

The Cunjevoi.

Colocasia macrorrhiza is our native "cunjeboy" or "cunjevoi," the former term probably more closely approximating to the aboriginal pronunciation. It must not be confused with the cunjevoi (*Cynthia*

præputialis) found attached to rocks about the sea, being very common on the Australian coasts and used as bait by fishermen. This is an Ascidian tunicate, of the animal kingdom. The vegetable cunjevoi, known also as green arum or spoon lily or Australian cabbage, grows along eastern and tropical Australia and extends to tropical Asia, including India and also to the islands of Oceania. It is an exceedingly attractive plant, growing in dense masses on the banks of rivers and creeks or in the moister and shadier parts of brush forests and scrubs or just within their margins or on alluvial lands subject to floods or about lagoons and marshes. It is sometimes cultivated in suburban and country gardens. It is not unlike the Calla lily in appearance and may reach in height from two to four feet. There are from six to ten exceedingly handsome, bright green, spear-shaped leaves springing from one base or stem and attaining a length of one and a half to two or even three feet with a breadth of six to twelve or even eighteen inches. The petiole or leaf stalk is thick and succulent. The beautiful inflorescence is carried on a long stalk, somewhat resembling a petiole. The spathe is twisted, green and spoon-shaped. The spadix is about the size of a finger and in its season becomes covered with yellow flowers which are succeeded by so-called berries or fruit like red currants in appearance. The whole plant contains a very irritant, acrid juice or sap when fresh, but this is highly volatile and heating or drying renders the corm or bulb innocuous. When fresh, the corm is considered to be a deadly poison. The stout stem also contains this acrid principle. The leaves and petiole are likewise full of the burning juice which will blister the lips if applied to them. Taken internally by man or beast, it causes great pain and swelling in the throat and tongue and is an intense gastric irritant. Curiously enough, I noticed a young tame native magpie of mine picking and eating portions of the young leaves without suffering any evident ill effect. I observed also that on my own unbroken skin of the hand the sap of the young leaf had no irritant action. Prolonged contact, however, of the juice of the mature leaf may cause vesication and pustulation. A newspaper account mentioned that some years ago a four-year-old girl who had chewed some cunjevoi flowers, died "raving mad" six hours afterwards. If unwashed hands, after touching the flowers, come in contact with the lips, they will cause agonizing, burning pain, lasting for a long time. In contact with the eyes the juice of the corm or leaf may cause intense conjunctivitis or destructive inflammation of the eye and may permanently impair or destroy vision. It has been stated that the juice was used by the blacks to poison their spear-heads. It does not, however, appear adapted for that purpose.

The Giant Nettle Tree.

One of the commonest uses of the cunjevoi is as an antidote to the sting of the indigenous giant or gigantic nettle trees (*Laportea gigas* and other

species), with which it often grows in association. These trees are sometimes called "surveyors' geranium." The leaves contain a large quantity of formic and acetic acids and are provided with a multitude of hairs or "stings" which inflict the injury. Horses and cattle become infuriated and maddened by contact with the leaves. The fluid contained in these leaves (especially the young ones) and hairs is a virulent acrid poison by mere contact. It causes intense, agonizing pain and suffering which may last for some time, and on subsiding may be followed by a secondary pain extending (if the hands have touched the leaves) up the whole limb and to the corresponding side of the trunk. This may persist for days or even weeks. The antidote is the milky juice of the bruised leaf or stem of the *cunjevoi*, rubbed on the affected part for an hour or more or intermittently at intervals of an hour or so. Or the corm of the *cunjevoi* may be cut in half and rubbed on the wounded area. There is no doubt that the toxic properties of the giant nettle are thus completely neutralized.

In Queensland the blacks use the pounded root with success in treating the wound or "sting" inflicted by the little "devil fish"—a species of ray. The native tribes also employed the leaves in the local treatment of the bites of venomous snakes. For insect bites and stings a common remedy was the application of the leaf mashed into pulp in boiling water.

Other Therapeutic Applications.

Cunjevoi is employed by the natives of India as an external stimulant and rubefacient. Here in Australia it is applied for muscular rheumatism. A leaf, warmed over a fire, is said to relieve the pain and expedite the healing of burns and scalds. The leaves also enjoy popular repute as curative if kept applied to cuts or furuncles. Sores and ulcers, even of long standing, whether following injury or not, are said to be cured by prolonged application of the leaves. *Cunjevoi* is said to be the best remedy for "north coast itch" in horses. For this purpose the plant should be well boiled and the horse thoroughly washed with the extract twice daily. The disease will be cured within six weeks, but may return the following season. It is believed that the *cunjevoi* leaf is one of the plants eaten as a cure (after being bitten in an encounter with a venomous snake) by our large monitor or lace lizard, popularly termed "goanna" (*Varanus varius*).

Cunjevoi as an Aboriginal Food.

I have read in one publication that the stout stem, after undergoing preparation, was eaten by the aborigines of New South Wales. This, I think, is an error. Doubtless the underground stem, popularly termed "root," was intended. The native tribes of New South Wales and Queensland very extensively dug up and utilized this "root" as an article of diet. Always, however, it was subjected to elaborate preparation, being pounded between flat stones and beaten repeatedly to express all the acrid juice much in the same manner as the

poisonous manioc (or manihot) root is rendered fit for food in the West Indies. By this process it becomes an insipid, farinaceous mass which is then cooked and eaten. Another method was to roast it slightly, then beat it for a long time with a stone or the back of a stone tomahawk. The alternate roastings and poundings were persisted in for a day or two, when it was ready for use. Sometimes it was first well washed. It does not make a tempting-looking viand, resembling black and yellow clay more than anything else.

A. Thozet, in "The Aborigines of Victoria," by R. Brough Smyth, 1878 (Volume I, page 233) gives a detailed description of the process of pounding and desiccation employed by the aborigines of north Queensland in preparing this article of diet. The plant itself was termed by the blacks "hakkin," "nargan" and "banganga." The parts used as food are the young bulbs or tubers (which are of a light rose colour inside) growing on the large old rhizomes. The bulbs, at first scraped, are cut in halves and placed under hot ashes for about half an hour. When sufficiently baked, they are pounded by hard strokes between two stones, a small one ("kondola") and a large one ("wallarie"). All pieces appearing watery and not farinaceous when broken are then cast away and the remainder, made into lumps (united by twos and threes by strokes of the kondola), is once more placed in the fire. The lumps are then taken out and pounded together in the form of a cake which is again returned to the fire and carefully turned occasionally. This operation is repeated eight to ten times, until the lumps are consolidated into one greenish-grey mass. When this mass begins to harden it is fit for use as food.

The *cunjevoi* was also employed in aboriginal medical practice in north-eastern New South Wales. The wife or gin of a sick man procured a curved *cunjevoi* leaf and a strong piece of string made from closely twisted opossum fur. She drew the string violently backwards and forwards against her gums until they were terribly lacerated and bled profusely. She then spat out the blood as it exuded into the "conjeboi" leaf and continued to saw her gums till she had obtained a considerable quantity of blood which was swallowed by the sick man. ("Australia from Port Macquarie to Moreton Bay," 1845, by Clement Hodgkinson, page 227). For further references to the *cunjevoi*, see articles by Professor J. Burton Cleland in THE MEDICAL JOURNAL OF AUSTRALIA, June 26, 1914, and October 10, 1925.

In addition two species of *Typhonium* indigenous to Australia may be mentioned as members of the arum family. *Typhonium brownii* inhabits New South Wales and Queensland. It also has acrid properties. The native blacks remove the acrid principle of the rhizome or tuber by a process of pounding or roasting, when it forms an article of their diet. *Typhonium angustifolium* is the "wan-jallo" of the Queensland aborigines. The bulb or tuber is roasted, broken with a stone, pounded a great deal and again roasted several times before being eaten as food.

OLLA-PODRIDA.¹

By W. J. L. DUNCAN, M.B., B.S. (Melbourne), D.O.M.S.,
Melbourne.

I PRESUME that one purpose of a paper is to provide a stimulus which will provoke a reaction in the way of increased interest in our specialty. If it were not so, I should feel rather diffident about presenting a paper which has little of scientific interest, but is rather a miscellany, a hotchpotch of odds and ends of ophthalmic lore. I read it somewhat in the spirit of the juggler who had nothing to offer his Madonna except his skill in tumbling. So he performed a few somersaults before her, not in a spirit of levity, but because he had nothing else to offer.

You will remember that of olden times it hath been written: "Is there anything new whereof it may be said, 'See, this is new'? It hath been already of old time; that which is done is that which shall be done; and there is no new thing under the sun." So it will not surprise you that five hundred years before Christ Herodotus describes Egypt as being replete with medical practitioners who were all specialists. The ophthalmologists were the most numerous of all; they were said to be extremely skilful and their fame was considerable. Nor are we surprised that at the beginning of the second century of the Christian era Nicarchus wrote a little poem entitled "The Oculist" which in Walter Leaf's translation reads thus:

If you wish to paralyse
Your enemy, don't "damn his eyes"
From futile blasphemy desist
Send him to the oculist.

Derivations.

With that brief introduction I should like firstly to consider the origin and derivation of a few terms commonly used in ophthalmology. The terms squint, strabismus and cast are all applied to the same disability and all three in origin illustrate different aspects of the lesion.

The term squint denotes failure of the muscle; although the origin is obscure, its source is probably Scandinavian from *svinka*, to shrink, a nasalized form of *svika*, to fail.

Strabismus points to the obliquity; it is of Greek origin, *στραβίζω*, I squint, *στραβός*, a squint, from *στρέφειν*, to turn.

The other term, cast, is rather the Scots' expression for squint. In olden days one of the terrors of life was the "evil eye." Even at the present day in parts of England and Scotland cross-eyed persons are reputed to have the power of "overlooking." The word is derived from the Swedish *kasta*, meaning to throw and the evil eye means a spell thrown or cast. So we see that a cast is piquant with meaning, for it has given rise to what has been termed the "evil eye"—the possessor transmits or casts his envenomed wishes over other human beings. That, I think, is the true origin of the term "cast." But

one must remember that one meaning of the word is to twist, turn or warp. We speak of a casting vote—the vote of the chairman when the votes are equal. His vote casts, turns or determines the motion. Seamen use the word cast, meaning to turn the head of the ship on the tack it is to sail.

Here I should like to remind you that John Knox had a squint. I refer not to the celebrated Scottish religious reformer, but to the famous teacher of anatomy at Edinburgh, most notorious in connexion with those two Irishmen, Burke and Hare. At that time no adequate provision was made for the needs of anatomy students and the only bodies they could legally dissect were those of murderers. Thus arose the resurrection men and the practice of raiding churchyards. As the supply still was inadequate, an ingenious idea came to the minds of Burke and Hare further to increase their gains by shortening the lives of a few of the inhabitants and selling their bodies for dissection. Such a procedure could not go on for long without the price being paid. Hare saved his life by confession; Burke was executed and, as in just retribution, his skeleton yet graces the museum of the Edinburgh School of Anatomy. The only thing that can be said to condone their conduct is that it was doubtless exceedingly difficult to make a living in a community of Scotsmen. Knox came under suspicion; a rival branded him as of "one-eyed obliquity," the implication being that the obliquity was moral as well as physical.

Concerning the origin of squint, the views of Sir William Reade, a quack oculist of Queen Anne's reign, are very interesting. Squints developing after puberty, he considered, were frequently due to keeping too much company with persons of the opposite sex, through excess of side-long glances. "Commonly," he says, "this distemper is most incident in children, presently after their birth, through the negligence of their nurses, who sit the cradle in which the infant lyeth, sideways to the light and not directly contrary to it, which maketh the children looking towards the light, to turn the eye on that side toward it, and thus by continuance, they are accustomed to turn the eyes awry, till the muscles have contracted a habit."

Iris appears originally to have been the personification of the rainbow and as the rainbow was often seen to vanish as quickly as it appeared, it came to be regarded as the swift messenger of the gods. Some writers represent the rainbow as merely the road on which Iris travels; so it appears and vanishes as the goddess wishes.

Generally the iris came to represent the rainbow itself and the iris of the eye was so called on account of its rainbow shape. Shakespeare in "All's Well that Ends Well" describes its origin in two interesting lines: "This distempered messenger of wet, the many coloured Iris, rounds thine eye!"

Collyrium corresponds to the Greek word *κολλῦριον*, a poultice, from *κολλήρα*, a cake or a roll of coarse bread—bread sopped in times past being a common application to the eyes. In like manner at the

¹Read at a meeting of the Ophthalmological Section of the Victorian Branch of the British Medical Association on June 29, 1929.

present day the laity, in the absence of medical advice, frequently make use of a bread poultice for a "stye." The same Greek word gave name to the Collyridians, a sect of Arabian Christians who worshipped the Virgin Mary and made offering to her of twisted cakes.

The earliest known collyrium was the collyrium of Danaus, a famous eye lotion sold at Constantinople in the early part of the first century. It was a very profitable affair, as it sold for £9 a bottle.

The use of medical terms by famous authors is always interesting. Emerson in one of his essays makes fine use of this word when he writes: "Great men are a collyrium to clear our eyes from egotism and enable us to see other people and their works."

The word "lens" is, of course, the Latin name for a lentil or small bean; the resemblance in shape between a double convex glass and a bean caused the name to be applied. Our parents often made use of the term "pebble." Not infrequently in their time spectacle lenses were made of a transparent and colourless rock crystal. These were termed pebbles. As they were a product of Nature and not an artificial product like glass, people ascribed to them special virtues. Unfortunately, in addition to being more costly, the index of refraction of crystallized quartz is not constant.

Cataract is derived from the Greek word *καταράκτης*. The oldest and obsolete meaning of the word is a portcullis or more rarely a window grating, whence arose the cataract obscuring the eye. The oldest English use of the word cataract is as a floodgate, usually in the phrase "the floodgates of heaven," as Milton's use:

... all the cataracts
Of Heaven set open on the earth shall pour
Rain day and night.

Later the word came to be used in the sense of a waterfall. The analogy between the developing opacity of a lens shutting or closing the aperture or window of the eye and a portcullis is very fine. There is no resemblance between an opaque lens and a waterfall.

Choroid, or more strictly chorioid (*χοριοειδής*) means having an appearance like the chorion—the covering or membrane of the fetus *in utero*, which it resembles in its very rich supply of blood vessels.

An undine in mythology was a spirit of the waters, a water nymph without a soul. Though soulless, she had certain privileges—she could marry with mortal man; on bearing him a child she obtained a soul and with it all the pangs and penalties to which the human race is heir. Just as there is some pitfall in every marriage, so the man who takes an undine to wife must forgo the pleasures of mixed bathing. For, if he should vex her while in the water, she returns to her native element. Gentlemen, if you remember that, while engaged in washing out an eye, you are holding a water nymph in the hollow of your hand, some romance will enter into even that prosaic duty.

Atropine comes from *Atropa belladonna*, the deadly nightshade. Atropos was one of the Fates,

the three sister goddesses whose province it was to spin the destinies of men and sever the thread at the appointed hour of death. She was the one that none could avoid, her name itself meaning inflexible. Belladonna is Italian for fair lady. When we consider that it was the fair and beautiful Eve who introduced the deadly poison of sin into the world and caused the downfall of the first of men and all our woe; that a charming descendant of hers was responsible for the siege of Troy and the death of hundreds of gallant men; that Delilah cost Samson his freedom and vision and Salome, John the Baptist his head; that Cleopatra lost Mark Antony a kingdom; that Parnell was broken and the Irish Party disintegrated by a woman; that the brilliant career of Sir Charles Dilke was smashed to atoms by the artifices of several women and that thousands of brave men have gone to their graves with disappointed hopes and broken hearts through the wiles of deceitful women, is it not fitting that a title implying a destructive adamant fate in the guise of a beautiful lady, should be bestowed on a virulent poison.

Superstitions.

Various superstitions in connexion with the cure of eye diseases grew up during the centuries. The water of various wells was credited with the power of clearing and strengthening the sight. In the British Isles there were about thirty wells for the treatment of disorders of the eyes. The water from the well of Saint Oswald used to be bottled and distributed widely; great was the belief in it as a cure for eye ailments. I cannot help thinking that this superstition with regard to wells has its origin in the miracle that Christ performed on the man who was born blind. The man's eyes were anointed with clay and he was told to go and wash in the pool of Siloam. He went his way and washed and came seeing.

There was an ancient superstition that to eat bitter fruit was good for the vision.

It was a very common practice a few years ago to introduce earrings in the hope of relieving affections of the eyes or of strengthening weak eyes. Sir Frederick Treves thought that there was a moiety of sense in this. The lobule of the ear is supplied by the great auricular nerve, coming from the second and third cervical nerves. The eye is supplied by the ophthalmic division of the fifth. The centres of these nerves have a definite connexion, the lower sensory nucleus of the fifth being a direct continuation upwards of the grey matter from which the posterior roots of the cervical nerves arise.

There is a general superstition that you can cure a stye by rubbing it with a wedding ring. One other method of achieving the same result is to go to the first crossroads and there repeat:

Stye, stye leave my eye
And take the first one that passes by.

Many superstitions exist with regard to the colour of the eye and the shape of the eyebrows; for example, hazel eyes betoken a good disposition. If your eyebrows meet, you will be rich. Heavy

eyebrows are a sign of long life. If your eye quivers, a stranger is coming. In "Romeo and Juliet" occurs the sentence:

Thou wilt quarrel with a man for cracking nuts having no other reason but because thou has hazel eyes.

Superstition, justifiable or not, still flourishes in the small realm of ophthalmology. Doubtless many of you have seen or read the books of Bates, Richardson and McFadden on perfect vision without spectacles. Recently a book has been published on perfect vision without eyes, an astonishing little book entitled "Eyeless Sight," written by a Frenchman, Jules Romains.

At the beginning of my paper I reminded you of the adage that there was nothing new under the sun. From the infancy of mankind unfortunate people born with or acquiring defective vision, must have cherished the wish that the sense of sight, like that of touch, was diffused throughout the body and thus not so readily eclipsed.

That subconscious wish has outcropped in various forms throughout our history. In early times the Greeks personified it as Argus, surnamed Panoptes, the all-seeing, because he had a hundred eyes, some of which were always awake. You will remember how, at the command of Zeus, the crafty Hermes lured him to sleep with the sweet notes of his flute and in the twinkling of an eye decapitated him. Hera in whose service he had been, transplanted his eyes to the tail of her favourite bird, the peacock,

Whose gay train
Adorns him, colour'd with the florid hue
Of rainbows and starry eyes.

It is possibly relevant to mention that Sir Isaac Newton described the phosphene produced by pressure on the eye, as like the eye of a feather from a peacock's tail.

As a dream is the expression of a subconscious desire, so when Ezekiel, somewhere about 600 B.C. had his vision of the cherubim, we are not lost in astonishment when told that "their whole body, and their backs, and their hands and their wings were full of eyes round about." 'Twill suffice to quote merely those two instances from the venerable past.

Coming to more modern times, John Milton, as the curtain of darkness closed in upon his diminishing view, projected the same wish into the mind of Samson, yet evidently the words are prompted by his own heart:

Why was the sight
To such a tender ball as th' eye confined,
So obvious and so easy to be quench'd?
And not as feeling, through all parts diffused
That she might look at will thro' every pore.

The same desire for less easily quenchable vision has found vent again in recent times and given birth to this book of Jules Romains. Strange to relate, his results and experiments are guaranteed by a considerable number of scientists and intellectuals, including the late Anatole France.

The author asserts that, as the result of hundreds of experiments with subjects chosen at random, he has proved beyond doubt the existence of extra-

retinal vision. According to him the human skin contains thousands of elementary eyes or oscilli which during the process of evolution of ocular vision have been disused so long as to make us unconscious of their existence. These oscilli are still sensitive to light and capable of transmitting images through the nerves to the brain. He discovered that any person, slightly hypnotized or at least preserving an intense concentration, could read and see when blindfolded and placed so that the print or object was well beyond the normal range of vision.

As would be expected there are numerous errors in the first attempts; gradually the images become clear impressions and the range of vision increases. Vision, he says, is imperfect when only a small area of skin is exposed.

"For example, if the hands are bare, the sleeves lifted to the elbows, the forehead clear and the chest uncovered, the subject reads easily and at a normal speed a page of a novel or an article in a newspaper printed in ordinary type." One is loath to contemplate the loss of sartorial dignity necessary to enable him to see $\frac{6}{4}$ and read J 1. As I have already mentioned, a number of French professors and scientists vouch for his results. Methinks that self-same wish was parent to his theory.

I wonder if at some future date this Frenchman's work will be found to contain the germ of truth. Blind men with eyes destroyed by war, disease and accident will then be able to see through any portion of uncovered skin. No longer will "they meet with darkness in the daytime, and grope at noonday as in the night." Like Janus we will look before and after. Romeos will be stabbed less tactlessly with the black eyes of white skinned Juliets and embark on a less tempestuous matrimonial sea, for that purblind boy named Cupid will observe the distribution of his shafts.

If this buried knowledge had been unearthed in the past, Polyphemus would have assuaged his hunger with Ulysses and the remainder of his crew. For Nelson, unable to turn his blind eye to the blandishments of Lady Emma, there would still be hope; with better vision he would discover some flaw in his would-be mistress and not thus dim his fame.

Again, when Lady Godiva rode through Coventry, clad in her imitation of modern Portsea fashions, that curious tailor, Peeping Tom, would not have lost his sight, but lived to a ripe old age with skinful vision.

Reports of Cases.

EARLY ENDOMETRIOTIC INVASION OF THE SIGMOID.

By J. BERNARD DAWSON, M.D., F.R.C.S.,
Honorary Assistant Gynaecologist, The Adelaide Hospital,
Adelaide.

THIS case of endometriosis is considered to be worth reporting, because among other manifestations of the

disease there was a very early implant of endometrial tissue in the wall of the sigmoid colon which was excised carefully, completely and subsequently submitted to thorough microscopical examination.

Clinical History.

Mrs. J., aged thirty, married seven years, *nullipara*, conception never having occurred, complained of dysmenorrhoea since the onset of menstruation at the age of fourteen. Her menstrual cycle was of twenty-eight days and her period of six days' duration. The pain had increased in severity during the past twelve months and was of a gripping character across the lower part of the abdomen. It occurred during the first two or three days of menstruation, being occasionally accompanied by retching and vomiting.

She had no intermenstrual discharge, no dysuria or frequency of micturition, no rectal symptoms and no disturbance of temperature, pulse or respiration.

Abdominal examination revealed only some deep-seated tenderness in both ilio-pelvic areas. The introitus was normal, the cervix was healthy and pointed directly down the vagina. The fundus of the uterus was in the first position of retroversion. To the right side of the posterior fornix could be felt a tender cystic adherent mass apart from which no right ovary could be determined. The left fornix was tender, but no mass could be defined. There was some thickening of the utero-sacral and the bases of the broad ligaments and some puckering of the vault of the posterior fornix. The presence of this fibrosis and puckering together with the other symptoms and signs justified a preoperative diagnosis of endometriosis.

Upon exploring the pelvic cavity the uterus was found to be in a position of slight retroversion with healthy and patent tubes. The right ovary, considerably enlarged, was lying behind the uterus to which and the right broad ligament it was closely and densely adherent. The left ovary, also slightly enlarged, was normal in position, but adherent at one point to the broad ligament.

There was some involvement in adhesions of the rectum and considerable thickening and contraction of the utero-sacral ligaments. A coil of non-adherent sigmoid colon lay across the brim of the pelvis. Upon separating the right ovary, a large chocolate cyst was opened; the disorganization was so great that oophorectomy was the only procedure that insured elimination of the endometriotic condition. Similarly, in the left ovary a smaller chocolate cyst was found and excised, sufficient healthy tissue being left to reconstruct a useful organ.

Upon the upper pole of the left ovary and immediately underlying the fimbriated end of the tube was a healthy recent *corpus luteum*. Upon the surface of the sigmoid colon was noticed a tiny puckered scar adjacent to which was a bluish spot not larger than a pin's head. Palpation revealed that under these in the wall of the gut was a hard fibrous nodule, measuring 2.0 by 2.0 millimetres. This appeared to be an extremely young endometriotic implant and it was carefully excised, the incisions extending to the circular muscle coat, but not opening the mucosa. Upon the surface of the right ovary was noticed a small red papule measuring not more than a millimetre in diameter. Both these tiny lesions were submitted to careful microscopical examination which revealed that they were both early endometrial grafts.

Before the microscopical appearance of these fragments is described, it is interesting to note that in this patient were found both well matured endometriotic cysts of the ovaries and implants so young and small as to be detected only by careful examination. This I believe to be due to a further dissemination of menstrual fragments from the abdominal ostia of the tubes rather than to secondary seeding from a rupture of an endometrial cyst of the ovary. Such cysts seldom rupture, the density of the adhesions they contract with neighbouring structures, seems to prevent this accident. Further, the position of the small papular elevation found on the right ovary was very suggestive of an implantation of a fragment of menstrual endometrium escaping from the fimbriated end of the right tube.

Macroscopical Description.

The specimen removed from the wall of the sigmoid was a small oval fragment, measuring seven by two millimetres, which included the serous, the longitudinal and part of the circular muscle coats. The serous surface was marked by a tiny puckered scar adjacent to which was a tiny blue spot, both measuring less than one millimetre in diameter. The whole piece of tissue was cut serially through its long axis.

Microscopical Examination.

It was found that there was some fibrosis underlying the scar of the serous coat, while the blue mark proved to be the surface indication of a small chocolate cyst situated in the subserous connective tissue and measuring about one millimetre in diameter. This contained altered blood and was lined by columnar endometrial epithelium slightly flattened by pressure (see Figures I and II).

The whole cyst was surrounded by endometrial stroma containing the typical cells and fibroblasts of uterine stroma examined during the interval or resting stage of the menstrual cycle. Lying deeper in the section among the fasciculi of the longitudinal muscle layer and in one place impinging upon the circular muscle fibres, were several, not more than four, typical endometrial tubules lined with columnar epithelium and embedded in typical resting stroma (see Figures III and IV).

Similarly, in the early implant removed from the surface of the right ovary, was found a tiny superficial chocolate cyst with one or two endometrial tubules pushing down into the ovarian tissues. It is difficult to escape the conclusion that both these specimens portray an early endometrial invasion.

A fragment of living uterine epithelium with some stroma deposited upon a conveniently adjacent coil of sigmoid, grafted and invaded the colonic wall. Its point of entrance through the serous coat healed to form the puckered scar. Its subsequent history was the usual one of endometriosis, the formation of a cyst and penetration deeper into the invaded tissue of newly formed endometrial tubules.

Comment.

In this specimen I take it that the cyst represents the original invading endometrium which, lodging immediately under the serosa, has been overtaken by a menstrual period, the bleeding of which has initiated the cyst, whilst the underlying young tubules are the product of further proliferation and penetration of the endometrial tissue. In fact, in some of the serial sections this process of proliferation can be seen as a budding from the epithelium lining the cyst. The ectopic endometrium not only responds to the menstrual impulse by bleeding, but also to the premenstrual stimulus by a hyperplasia of tubules which, having no outlet, continue the invasion (see Figure V).

In considering the peculiarly invasive character of ectopic endometrium, it is necessary to remember that although other epithelia can and do exhibit a capacity for hypertrophy, for example, papilloma of the bladder or skin, there is no other tissue the normal function of which is to respond to a monthly hormonal stimulation by rapid and generous growth. It is this that leads to the extensive spread of ectopic endometrium. In the uterus this menstrual hyperplasia is corrected by the crumbling and loss of the thickened endometrium which each period, but if it is imagined that there were no such escape, it is clear that the uterus would soon become very similar to an endometrioma, a tangled mass of endometrial tubules interspersed with hæmorrhagic cysts.

This seems to be the answer to the query why these endometrial ingrafts proliferate and invade so rapidly as to disorganize any viscus that reluctantly plays the part of host. They are subject to ovarian influence, the endocrine stimulation of which demands a cyclic hyperplasia.

If these odd infiltrations were due to a metaplasia of peritoneal endothelium it is difficult to understand why it is endometrial tissue that is always forthcoming and why not at times structures similar to the Fallopian tube, cervix or upper part of the vagina, all of which are

products of the coelomic epithelium that originally entered into the structure of the primitive Müllerian system.

Examples of early endometriosis such as this offer considerable support to Sampson's implantation theory of their origin; the puckered scar of the serosa cannot but indicate the point of entry of the fragmentary graft, whilst the tiny cyst and deeper proliferation indicate the endometrial response to probably one menstrual period.

A study of this and of other cases of endometriosis suggests that possibly the aetiology can be carried yet a stage further back. Why are women suffering from endometriosis invariably sterile? They have patent tubes and often some normally functioning ovarian tissue. In this particular case the fimbriated end of a patent tube was embracing a normal recent corpus luteum which, of course, represented a recently ruptured Graafian follicle.

Accepting the view that endometriosis is a sequel to retrograde flow of menstrual blood and fragments along the tubes, is it not possible that some functional derangement causing reversed peristalsis of the tubes may explain both the sterility and the escape of blood into the pelvis? Such a reversed peristalsis would occasion the sterility which certainly cannot in many cases be accounted for by any organic lesion.

This postulated functional derangement of the activities of the tubes may apparently be primary or acquired, but there is no indication whatever of its cause except to attribute it to that blessed "*asylum ignorantie*," endocrine imbalance.

It is of interest to notice how dense is the fibrosis that surrounds even so young an endometriosis as the one described. This firm fibrous tissue under the microtome blade felt almost cartilaginous, interfering considerably with the even cutting of the sections. This connective tissue reaction must be regarded as a protective mechanism, as an endeavour on the part of the invaded organ to limit the invasion and to encyst the rapidly proliferating endometria in a way not unlike the encapsulation of a foreign body.

Acknowledgements.

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Reviews.

THE MENTALLY DEFICIENT.

THE fifth edition of Dr. A. F. Tredgold's text book on mental deficiency comes at a time when both professional and public interest is gradually becoming more centred on the question of amentia and particularly on the subject of the mentally deficient adult.

A large section of the book has been revised and the statistics brought up to date. The reports of the Joint Mental Deficiency Committee of the Board of Education and the Board of Control have been used and certain legal alterations have been made in accordance with the Act of 1927. Important information dealing with the prevention of mental deficiency and its allied problem, the control of propagation of defectives, together with the relation between amentia, crime, pauperism and venereal disease have been added to the latter part of the book. These features together with a number of new illustrations contrive to make this present volume what in the late T. S. Clouston's opinion it was in 1914—"the best book on its subject in the English language."

It is quite unthinkable nowadays that any intelligent man would deny the national importance of the problem of mental deficiency. Yet few doctors not practising in the

realm of psychiatry seem to realize the magnitude of the problem, the very basis of which is that in Great Britain today there are as many as 0.8% of the general population certifiable aments. Nor would it be difficult to quote figures which show that Australia is faced with a similar problem and so far has made little attempt to deal with it. Apart from the certifiable aments, there are in Great Britain no less than 600,000 dull or backward children. "This group," writes Sir George Newman, "is unable to respond with proper benefit to our educational system, and adds 50,000 recruits to our industrial army every year who are not only unprepared, by mental retardation, to meet effectually the demands of full life, but who furnish society with the bulk of its inefficient adults—criminals, paupers, mendicants and unemployables." It is therefore the preventive aspect which should give pause for thought among all who are concerned with national health and perusal of this book for this reason should commend itself to all medical practitioners. It is not only a text book written by a leading British expert and valuable to all psychiatrists, but its subject matter is brilliantly presented, clearly written and its appeal is to those interested in any branch of social activity.

It is safe to say that there is no other work on this subject in English which in one volume contains so much accurate information in such a lucid form.

PÆDIATRICS.

A SECOND edition of "Diseases of Children" by Garrod, Batten and Thursfield has appeared after the lapse of sixteen years under the able editorship of Dr. Hugh Thursfield and Dr. Ronald Paterson.¹ The form of the first edition has been retained and each of the thirty-six contributors has been chosen to deal with a subject of which he has special and expert knowledge.

There has been an extensive revision of almost the entire volume and much of the more recent knowledge has been included, while the more valuable portions of the earlier edition have been retained. The book deals mainly with disease in its clinical aspects and treatment is indicated often on general lines only, minor details being omitted. Dr. A. M. Gossage opens with an interesting chapter on heredity. Dr. Edmund Cautley and Dr. Donald Paterson deal clearly and concisely with the feeding of infants and children. In their estimation of food requirements, however, they prefer not to use the caloric method and they recommend for everyday use various patent food preparations unknown in this country. In the treatment of infantile atrophy Dr. L. G. Parsons places his trust entirely in lactic acid milk to the exclusion of all other foods.

For purposes of reference the chapters on diseases of the nervous system (Dr. F. E. Batten revised by Dr. W. G. White), ductless glands (Dr. E. A. Cockayne), bones and joints (Sir Humphry Rolleston and Mr. H. A. T. Fairbank) and metabolic disorders (Sir A. E. Garrod revised by Dr. E. A. Cockayne) will be found to be of great value.

Discussion of the more common ailments has followed the usual lines, but statements with regard to the causation and treatment of hæmorrhage of the new-born cannot be generally accepted, nor is the operative treatment of megacolon based on modern methods. Again it is open to argument whether the best time to open an empyema is the moment that pus is found in the pleura. The discussion on variations in the surgical procedure in cleft palate operations is unnecessary and the chapter on the diseases of the eye is so short as to be of little value.

There are a number of interesting illustrations and a short bibliography. The book should appeal to all students of pædiatrics both for the more common diseases and for purposes of reference.

¹ "Mental Deficiency (Amentia)," by A. F. Tredgold, M.D. (Durham), F.R.C.P. (London), F.R.S. (Edinburgh); Fifth Edition; 1929. London: Baillière, Tindall and Cox. Demy 8vo., pp. 551, with illustrations. Price: 25s. net.

¹ "Diseases of Children," Edited by Hugh Thursfield, D.M. (Oxen.), M.A., F.R.C.B., and Donald Paterson, M.B. (Edinburgh), M.R.C.P.; Second Edition; 1929. London: Edward Arnold and Company. Royal 8vo., pp. 1117, with illustrations. Price: 45s. net.

The Medical Journal of Australia

SATURDAY, NOVEMBER 9, 1929.

Phosphorus Poisoning.

STUDENTS of medicine are taught a few details concerning the effects of white and yellow phosphorus on workers handling these poisonous substances. They are supposed to know that absorption of phosphorus may lead to a general toxic effect, usually known as phosphorism, or it may exert a specific local action on the inferior maxilla, spoken of as "phossy jaw." Few medical practitioners have seen either form for many years. The association of phosphorus poisoning and lucifer match manufacture is still remembered and it is therefore not surprising to learn that an obscure affection in an employee in a match factory has recently been diagnosed as phosphorus poisoning, despite the fact that white and yellow phosphorus are no longer employed. The story of this industrial danger is both instructive and fascinating.

Necrosis of the lower jaw was a very common ailment among lucifer match makers up to the end of last century. The incidence varied considerably, but even under the least unfavourable conditions the sacrifice of health was large and the toll of life was by no means negligible. In Great Britain the incidence in the early years of the present century was about 3.25%; in Austria it was 18.5%, while Teleky was able to record from his own observations that as many as three hundred and fifty match workers were affected in Vienna in the course of ten years. It is therefore not surprising that the British Government was persuaded in 1899 to appoint a commission of inquiry into this serious menace to health. The members of the commission were Thomas Oliver, Edward Thorpe and George Cunningham. They confirmed the prevalence of necrosis of the lower jaw among lucifer match makers and reported that while both white and yellow phosphorus were extremely dangerous, the amorphous sesquisulphide of phosphorus was harm-

less and should be used instead of the former. There was, however, some technical difficulty in adopting this recommendation. Amorphous red phosphorus was found to have too low an ignition point. As a result of the inquiry an attempt was made by the Factory Department of the Home Office to induce manufacturers of lucifer matches to adopt general measures calculated to reduce the risk of absorption of phosphorus by workers handling matches. The result, however, was not satisfactory. In 1906 an international convention was held in Berne at which the chief nations of Europe were represented. It was resolved at the conference to prohibit the use of white and yellow phosphorus. The nations who undertook to adopt this measure were France, Germany, Italy, Holland, Denmark and Switzerland. Great Britain did not sign the undertaking, as it was hoped that a practical solution might be discovered which would not involve the industry of match makers in heavy losses.

In 1907 legislation was passed in Germany prohibiting the use of white and yellow phosphorus. The German Government undertook to distribute without charge to manufacturers a substitute for poisonous phosphorus. It appears that in 1893 a German chemist named Kassner discovered calcium plumbate. Schwiennig suggested the use of this compound together with amorphous red phosphorus for the manufacture of lucifer matches. The combined substance is non-poisonous; it has a high ignition point, it is non-explosive and when dry it ignites on friction. The German Government provided this Schwiennig powder to the manufacturers until the economic loss resulting from the legislation of 1907 was covered. In the following year the manufacture, importation or use of matches made with white or yellow phosphorus was prohibited in Austria.

In 1906 six persons died of phosphorus poisoning acquired in match making in England. Parliament was repeatedly asked to take some deliberate action to eliminate this industrial danger. As a result of this pressure a bill to prohibit the use of white or yellow phosphorus was introduced into the House of Commons in October, 1908. The measure was non-contentious and met with no opposition. The *White Phosphorus Matches Act* obtained Royal

consent in the same year. By this time there were several substitutes for the poisonous forms of phosphorus, all based on combinations of sesquisulphide of phosphorus and one of the plumbates. It should be pointed out that safety matches were manufactured many years before. For this the amorphous form was used, but the technical difficulties were not so great as with ordinary lucifer matches, since the high friction ignition point was not required. The ignition was effected by the use of a specially prepared striking surface attached to the box. Safety matches originated in Sweden and have been non-poisonous from the first.

It will thus be seen that while "phossy jaw" and phosphorism were widespread and serious industrial diseases in Europe up to 1906, the compulsory replacement of white and yellow phosphorus by some harmless substitute has resulted in the complete disappearance of poisoning in the match factories. The problem has not been felt in Australia. The manufacture of lucifer matches in Australia is a comparatively recent development and as far as we are aware white or yellow phosphorus has not been used at any time, at all events on a large scale. Medical practitioners can therefore be assured that there is no special need for anticipating the occurrence of phosphorus poisoning in persons employed in the making of matches.

Current Comment.

PROTEIN PRECIPITATION IN URINE.

THE antigen-antibody phenomenon of the precipitins has been applied in practice almost exclusively to forensic purposes. In 1899 Tschistowitsch discovered that if the blood proteins of one animal were injected into an animal of another species, the serum of the treated animal acquired the property of causing a precipitate of protein of the serum of the animals belonging to the same species as the first animal. Later it was found that a specific reaction could be obtained only when strongly acting serum was used. The substance or property produced in the serum of the treated animal is spoken of as precipitin and is supposed to be attached to the pseudoglobulin fraction. Chapman and others have shown that the first response to the injection of a foreign protein is the appearance of a precipitin active to all forms of protein. If the injections are continued, the

precipitins obtain a specific character and react only with the proteins of the animals from which they are taken. Thus if human blood serum is injected into a rabbit, the rabbit serum will gain the power to precipitate proteins generally and later will possess the power to precipitate protein of human blood, but not of the blood of other animals.

Albumin in the urine of persons suffering from nephritis is supposed to behave like other forms of human protein. It has, however, been suggested that under certain conditions the albumin contained in urine is derived from sources outside the human body. These considerations have led to several endeavours to distinguish the forms of albumin contained in human urine and to associate certain forms of protein with the physiological or pathological sources of the albuminuria. These attempts have not been successful, although Wells and others have endeavoured to distinguish globulin from albumin by means of a precipitin containing serum. In the course of the work on the precipitins it was found that it was possible to produce antibodies active to bacterial solutions. For a time it was claimed that the bacterial precipitins acted on non-protein constituents. This view has now been relinquished.

Ralph M. Tandowsky has conceived that there may be a distinction between the protein elaborated by acutely inflamed renal tissue and protein normal to the human body that is able to escape through the renal filter in some unexplained way.¹ He does not inform the reader concerning the grounds on which he based this conception, nor how he would explain a biological differentiation between the protein derived from disintegrating parenchyma and protein from normal tissue fluids. He states that he attempted to produce a precipitin active to the albumin in nephritic urine by injecting normal renal tissue into rabbits, but failed. He gives no details of the method employed in the attempt to produce the precipitin. If he merely ground up the tissue and suspended it in glycerin, it is very doubtful whether he would obtain a precipitin. On the other hand if he took steps to disintegrate the cellular material and to liberate the tissue protein in solution, the result would probably have been different. Having come to the conclusion that normal kidney tissue was unsuitable as an antigen, he tried the kidney of a girl who had died of sub-acute diffuse nephritis. The antigen was prepared by grinding the frozen renal tissue in glycerin and adding distilled water. No doubt the renal protein was in a condition suitable for solution. This antigen, when injected in increasing quantities into male rabbits, led to the production of an active precipitin. He collected the specific serum and tested albuminous urine from five hundred patients with it. It appears that one hundred and fifty-two patients had clinical signs of nephritis. The urine of one hundred and thirty-three of these patients

¹ *The American Journal of the Medical Sciences*, July, 1929.

reacted with the serum. Of the nineteen others, ten were suffering from chronic interstitial nephritis, which has been held to be a sclerotic rather than an inflammatory process. No precipitate of albumin was obtained with the urine of 357 patients. Nearly all were suffering from diseases not associated with nephritic changes. It is possible that the albuminuria in these patients was the result of some failure of the renal filter other than an inflammation of the tubules. He gives no information concerning the chemical and physical characteristics of the urine and it is therefore not possible to form a reliable estimate of the phenomena with which he deals.

It has been shown by Uhlenhuth and many others that under certain well defined conditions precipitinogens may be organ-specific. An example of this is the crystalline lens. The lens protein has been employed as an antigen and a precipitin specific to lens protein has been obtained. The lens protein, however, possesses characters distinct from the protein of serum and of tissue cells. Attempts to produce clear evidence of organ-specificity have not been altogether successful and before this phenomenon can be cited as an explanation of observed facts, every other possibility must be explored. If Tandowsky's observations can be confirmed by others, it will be necessary to assume that the precipitin or partial precipitin is not active to human cell proteins as a class. The possibility of a bacterial precipitin must be considered. To exclude this explanation the extract of inflamed kidney should be passed through a bacterial filter and then used as an antigen. Further, the precipitating serum should be tested against a solution of the proteins derived from bacteria grown from the kidney itself. It would also be advisable to determine by direct experiment whether the serum precipitated the whole of the albuminous substance from the urine or whether the filtrate after precipitation still contained a protein. There are many other avenues of approach to the study of the biological qualities of the albumin in nephritic urine. While it does not appear to us that Tandowsky has contributed much to our knowledge of this subject, he certainly has indicated a channel of investigation that should be followed.

THE TREATMENT OF ENDOMETRIOMATA.

The subject of endometriomata was discussed in considerable detail at the third session of the Australasian Medical Congress (British Medical Association) from the pathological aspect and from that of symptomatology and treatment. J. Bernard Dawson, of Adelaide, read a paper dealing with the two last mentioned sections of the subject. A summary of his paper will be found in the issue of this journal of October 12, 1929. In the present issue he reports the occurrence of two extremely small endometrial deposits on the intestinal wall and the ovary respectively. These were treated by local

excision. Dawson's view that portion of the Fallopian tubes should be excised at the time of removal of the endometrial tumour in order that the dissemination of endometrial cells may be prevented, will appeal to many of those who hold the theory of Sampson. Those who believe, as Cleland does, that these tumours are not neoplastic, but neoplastic-like, will regard this as unnecessary, especially as full term pregnancy has been recorded in patients from whom endometrial tumours have been removed.

In view of Dawson's interesting report in this week's issue and of the congress discussion it will be useful to consider a paper read at a meeting of the Royal Society of Medicine by Charles D. Read and Frederick Roques.¹ They deal with the results of operative treatment of forty-one patients. They have excluded from their series all cases in which the diagnosis was not confirmed by microscopical examination of the excised tumour. They have been able to trace forty-one out of sixty-three patients. Of the forty-one twenty-five suffered from endometrioma of the ovary, eleven suffered from uterine endometrioma, in three instances the tumour was situated in an abdominal scar, in one it was in the recto-vaginal space and in one in the umbilicus. The ovarian growths were divided into two groups, those in which both ovaries were removed with or without hysterectomy, and those in which the growth was excised from one or both ovaries or in which one ovary only was removed in its entirety. Two patients were submitted to hysterectomy and complete removal of ovarian tissue after conservative surgical measures had failed. Of the twenty-seven patients treated for ovarian tumours, thirteen had all ovarian tissue removed; ten of these were "cured," two were improved and in one there was no change. Of the fourteen treated by conservative measures, ten were "cured," two were improved and in two there was no change. In regard to so-called cure it should be pointed out that the time which had elapsed since operation varied from seven months to six years. Of the patients with uterine endometriomata two were treated by local excision, one was "cured" and one was improved. Nine were treated by hysterectomy and all were "cured." Read and Roques state that until the pathology of the condition is completely understood, it will be impossible to be dogmatic about the treatment. This is obviously correct. At the present time it would seem that local excision of small nodules, such as those described by Dawson, and even of larger growths involving only a small portion of an organ, is as successful as more extensive mutilations. In regard to radium there are relatively few data. Read and Roques report a case in which it was successfully used in a growth filling the pelvis. Just as radium in skilled hands has practically replaced surgery in the treatment of malignant disease of the uterus, it will probably be used exclusively in extensive pelvic endometriomata.

¹ *Proceedings of the Royal Society of Medicine*, September, 1929.

Abstracts from Current Medical Literature.

OPHTHALMOLOGY.

Hemangioma of the Cerebellum and Retina (Lindau's Disease).

H. CUSHING AND P. BAILEY (*Archives of Ophthalmology*, September, 1928) review the literature of retinal angiomatosis, known later as von Hippel's disease, from the first recorded case by Fudis in 1882 to the present day. Lindau in 1926 showed its association with hemangiomatous cerebellar cysts and with cysts in various parts of the body. The authors present the case of a man of thirty, operated upon for cerebellar tumour. It was successfully excised and was at first considered to be a vascular gliomatous nodule. Further consideration showed that it was in reality a hemangioblastoma. Examination of the patient's fundi later revealed an angioma of the retina. Hence a neurologist faced with a cerebellar tumour may get some guidance by carefully examining the whole of the ocular fundi and the oculist, seeing a retinal angioma, should realize the possibility of cerebellar symptoms. The typical picture consists of a pair of highly enlarged vessels often emerging from the lower part of the disc to disappear in a small tumour mass in the periphery. Secondary changes occur in the shape of opacities and exudations which may fall into the category of Coat's proliferative retinitis.

Iridocyclitis.

A. L. BROWN (*American Journal of Ophthalmology*, February, 1929) advocates the use of subconjunctival injections of atropine and adrenalin in obstinate cases of iritis attended with synechia. The injection is made at the limbus near the iritic adhesions. He injects 0.24 mill (four minims) of adrenalin and 0.06 mill (one minim) of a 2% solution of atropine.

Contact Glasses for Conical Cornea.

D. H. O'ROURKE (*American Journal of Ophthalmology*, March, 1929) after describing earlier attempts, states that in 1920 Stock first showed ground contact glasses as made by the firm of Zeiss (Jena). This shell had the scleral and corneal contour of the anterior two-fifths of the globe. The corneal segment, bulging forward, formed a corneal chamber. The corneal segments of the glass were made in three diameters, 13 millimetres, 12.5 millimetres and 12 millimetres. The height of the corneal segments was four millimetres, 4.5 millimetres and three millimetres respectively. Corneal curvatures of a radius of 6.5 millimetres, 7.1 millimetres, 8.1 millimetres and 9.0 millimetres are available. The author has experienced difficulty in the placement of the shell and has devised a simple apparatus whereby the patient can place it himself with the necessary

amount of salt solution between the cornea and the glass and free from air bubbles. The apparatus consisted of a glass bottle to the lower outlet of which is attached a rubber tube and rubber bulb. In the upper outlet of the bottle is a perforated rubber cork through which fifteen centimetres (six inches) of glass tubing rises vertically capped by a wider rubber tube over which was stretched a gum rubber finger cot perforated by a pin point in the centre. The bottle is nearly filled with water. The cot receives the convex surface of the shell filled with salt solution. Release of pressure on the bulb causes the shell to be held firmly in position by air pressure. The patient retracts his lids and places his eye over the centre of the shell. Pressure on the bulb then releases the shell from the cot and it remains fixed on the cornea.

Medical Treatment of Glaucoma.

CH. ABADIE (*La Presse Médicale*, February 16, 1929) believes that glaucoma is a disease not of the eye itself, but of the sympathetic, expressing itself by an excitation of the vaso-dilators of the ocular vessels with resulting hypersecretion and hypertension. For this reason he advocates medical treatment, ten to twelve drops of one in one thousand adrenalin to be taken three times a day in water, also twenty centigrammes of ergotine per day in two cachets of ten centigrammes and two grammes of calcium chloride per day in water. The ergotine and calcium chloride may be combined in a mixture. Pilocarpine drops are used as well. He reports successes, but his views were not received by his colleagues.

Trichinosis with Exophthalmos.

B. W. KEY (*American Journal of Ophthalmology*, March, 1929) describes the case of a young German, aged twenty-five, complaining of tearing, puffiness of the lids and headache. Examination revealed oedema of the face, chemosis of both conjunctiva, proptosis of the right eye and variable acuity of vision. The blood count revealed 69% eosinophilia and the temperature reached at times 40.2° C. (104.5° F.). He used to eat raw ham for his dinner. A small section of the deltoid was teased under the microscope and was found to contain an embryo *Trichina spiralis*. The author states that oedema of the face and lids is the most prominent and characteristic physical sign observed in this condition and that many of the patients consult the ophthalmologist first. Therefore, the responsibility for an early diagnosis may be placed on him.

Herpes Zoster Ophthalmicus.

J. S. FRIEDENWALD's patient was a woman of forty-seven years who developed a lesion resembling simple herpes on the left cheek (*Bulletin of the Johns Hopkins Hospital*, August, 1929). A week later she had neuralgic

pain in the face, hyperæsthesia of the forehead and pain in the left eye. This was soon followed by typical zona lesions from the tip of the nose to the vertex of the scalp, also lesions of the nasal mucous membrane, conjunctiva and cornea. There was also iritis. Five days after the onset of the vesicles the patient was given an intramuscular injection of 8.5 cubic centimetres of the blood serum of another patient who six weeks before had recovered from a severe attack of perineal herpes zoster. Five hours after the injection the patient was more free from pain than previously. Next day the lid oedema had decreased and the skin rash began to subside. The iritis persisted longer. In three months the vision of the left eye was $\frac{1}{12}$ and two months later $\frac{1}{4}$. In view of the probability of loss of vision in cases of this kind the author considers the result notable.

Hæmangioma of the Meninges.

R. FOSTER MOORE (*British Journal of Ophthalmology*, May 19, 1929) relates the case of a boy of twelve with poor vision in the left eye. He had a nævus of the left half of the face involving the eyelids. There was slight dislocation of both lenses. The fields of vision manifested an incomplete right homonymous hemianopsia. A diagnosis was made of nævus of the visual cortex which was confirmed by a skiagram of the skull. A wedge-shaped tumour composed of a new growth of large vessels was seen, the apex being in the temporal and the base in the occipital region. A number of these cases has been reported. The presence of nævi often serves to point to the diagnosis. Meningeal hæmangiomas are often associated with congenital malformations of the eye, such as buphthalmos, heterochromia iridis, coloboma of the disc or a high degree of astigmatism. There is also an association between these cerebral tumours and retinal hæmangiomas or Coat's disease.

Kerato hæma.

D. DAMI (*Revue Générale d'Ophthalmologie*, January, 1929) reviews the history, literature, pathology and ætiology of kerato hæma or blood infiltration of the cornea and reports the cases of his own. The first patient was a girl of thirteen who injured her right eye splitting wood. The eye was full of blood and soft. Eleven days later the anterior chamber appeared to be full of a greenish-brown mass which subsequently began to absorb from the periphery. Three weeks later it was definitely noted that the posterior surface of the cornea was coloured brownish-green. The second patient, a man of thirty-seven years, fell from a ladder and was found to have subconjunctival hæmorrhage and corneal abrasions in both eyes. A month later he had blood infiltration of the right cornea. The author quotes a case reported by Vossius, namely, that of a girl of fifteen wounded by glass in her left eye. She had intraocular bleeding, acute pain,

high tension and blindness. The cornea presented a brownish-red colouration which later became green. The eye was excised and the cornea examined. Microscopically it appeared to be stuffed with minute round shining yellow corpuscles. A few anterior lamellæ and a few posterior lamellæ were free of the corpuscles. They seem from their appearance and reactions to be derivatives of blood pigment. The whole cornea gives the reaction for iron, but the corpuscles do not. The author, commenting on this, concludes that there are two distinct pigments in the cornea, one in the corneal parenchyma, giving iron reactions, hæmosiderin, the other in the form of corpuscles in the lacunæ of the cornea, iron free, hæmatoidin. There is only one cause of this condition, namely, traumatism. The pathology is mechanical, depending on venous stasis at Schlemm's canal and the anterior ciliary vessels, possibly favoured by some trophic disturbance of the cornea and influenced by intra-ocular tension. Partial cure occurs spontaneously. There is no useful treatment.

Surgical Treatment of Blepharospasm.

E. S. GURDJIAN AND H. W. WILLIAMS (*Journal of the American Medical Association*, December 29, 1928) describe three cases of blepharospasm intractable to treatment and causing so much trouble that the patients were willing to undergo surgical treatment. Two patients were men, aged thirty-eight and fifty years, and one a woman, aged forty-five years. The first patient was cured (for six months at least) by neurectomy of the upper two or three branches of the facial nerve. An incision about 2.5 centimetres (an inch) in length is made along the line joining the upper border of the tragus to the lower lids. The nerves are found by blunt dissection and divided. In the other two cases 90% alcohol was injected in the same region with considerable relief.

OTOLOGY AND LARYNGOLOGY.

Dysphagia Due to Pharyngeal Paralysis.

W. M. MOLLISON (*The Journal of Laryngology and Otology*, November, 1928) considers that dysphagia, though a common symptom, is not often due to paralysis of the pharynx. However, in the last few years he has encountered several examples of this condition. The nerve supply of the pharyngeal muscles comes from the pharyngeal plexus and is derived from the *nucleus ambiguus* in the floor of the fourth ventricle. Thirteen cases are reported in detail. In the first seven the cause appeared to be injury, that is, hæmorrhage or embolus to the *nucleus ambiguus*. The eighth was a case of pharyngeal and laryngeal paresis of long standing, though previously unnoticed. The ninth was that of a girl, aged eleven and a half years, whose symptoms occurred after bi-

lateral quinsy. The other four infections followed polio-encephalitis. The signs noticed were paresis of the pharyngeal wall and excessive mucus in the pyriform fossa.

The Pathology of Otosclerosis.

OTTO MAYER (*The Journal of Laryngology and Otology*, December, 1928) discusses the pathology of otosclerosis. He reviews the work of various investigators and he states his own carefully proven findings. Numerous plates illustrate the article. The disease of the bony capsule occurs in sharp circumscribed areas, in definite typical positions which are bilaterally symmetrical. The most common site is just in front of the oval window. Other sites are the external margin of the round window, the inner aspect of the internal auditory meatus, the region of the semicircular canals and very rarely the knee of the carotid canal. Opinions vary as to the origin of these areas, but the author is satisfied that the development of the disease is characterized by an absorption of old bone causing spaces of various sizes to be left. These spaces are filled with an osteoplastic marrow. From this marrow new bone is formed and is distinguished by the presence of especially large osteocytes which stain dark with eosin-hæmatoxylin. This condition indicates an unripe tissue and is peculiar in that it is never found elsewhere in normal or pathological conditions of the labyrinthine capsule. This imperfect new bone becomes gradually surrounded by more perfect bone. This change is not a pathological transformation because pathological processes develop in quite a different way. Further, it is not an inflammatory process, for there is no exudation, nor are there leucocytes or plasma cells. Thus otosclerosis is a hyperplasia. This theory is borne out by numerous facts, namely, the appearance and mode of growth of these areas; further they are multiple and bilaterally symmetrical. The most common site for the lesion is in front of the oval window and here a synchondrosis exists in the external aspect of which the area of otosclerosis commences. The author's hypothesis is that otosclerosis areas are really pathological growths arising from embryonic maldevelopment. To support this is the fact that in cases of otosclerosis other bony abnormalities have been noted in the petrous portions of the temporal bone and the labyrinthine capsule. Multiple exostoses are usually hereditary. Another disease of the bone, the *osteitis deformans* of Paget, has a connexion with otosclerosis. In several temporal bones of patients suffering from Paget's disease, bony changes similar to otosclerosis were noted in the labyrinth. The only difference is that Paget's disease is a more diffuse change. An important fact is the combination of otosclerosis with blue sclerotics and osteopetrosis and this combination can be traced back to a constitutional anomaly of the connective tissues. If

this is so, the coincidence of the sclerotic area and tumours of the eighth nerve can be understood, as the tumours are neurofibromata. With no other hypothesis it is possible to bring otosclerosis into the realms of general pathology nor does any other hypothesis agree well with the recognized process of disease in other parts of the system.

Chronic Suppuration of Middle Ear.

HASSAN BEY SHAHAEN (*The Journal of Laryngology and Otology*, January, 1929) reports success in the treatment of chronic suppuration of the middle ear by injections of boiled milk. The milk is boiled for from three to ten minutes and five to ten cubic centimetres are injected at body heat. The injections are repeated at intervals of four to five days. The abdominal wall is the usual site of injection. Severe general reaction such as elevation of temperature and malaise may occur, but if the dosage is properly regulated, this can be lessened in severity. Twenty-seven patients treated have shown definite improvement in regard to quantity, odour and nature of discharge. Granulations shrink and healing has frequently occurred. Favourable results have been noted also after radical mastoid operation.

Intrinsic Cancer of the Larynx.

ST. CLAIR THOMSON (*Canadian Medical Association Journal*, July, 1929) discusses the lasting cure in 76% of his patients with intrinsic cancer of the larynx, operated upon by laryngo-fissure. He is satisfied that this operation of splitting the thyroid cartilage and removal of thyroid ala, together with wide excision of the soft tissues of the affected side, is at present the best method of treatment. Intrinsic cancer must be diagnosed early and this can be done only by laryngeal examination by a specialist. The only symptom for a long time is hoarseness. A patient with hoarseness lasting more than three weeks should have laryngeal examination to exclude neoplasm. Among the seventy-four consecutive patients operated on, two died within forty-eight hours following narcotic administration and the author now forbids the use of opiates either before or after operation. A third patient ruptured his œsophagus on the fourth day owing to excessive vomiting. This makes an operation mortality of 4%. Of the seventy patients thirty-four are alive and free from recurrence for periods of one and a half to nineteen years. Eighteen patients have died from other causes without recurrence. Seven died from malignant disease elsewhere, the larynx remaining free, and eleven had local recurrences. The patients' ages were from forty to eighty in sixty-three men and thirty-five to fifty-eight in seven women of the series. The voice after operation is quite useful. Clergymen, doctors and barristers are among the patients operated upon who were able to resume their vocations.

British Medical Association News.

SCIENTIFIC.

A MEETING OF THE NEW SOUTH WALES BRANCH OF THE BRITISH MEDICAL ASSOCIATION IN CONJUNCTION WITH THE SECTION OF ORTHOPAEDICS AND THE SECTION OF PATHOLOGY AND BACTERIOLOGY was held at the B.M.A. Building, 30-34, Elizabeth Street, Sydney, on June 27, 1929. DR. BROWN CRAIG, the President, in the chair.

Focal Sepsis and Arthritis.

DR. C. H. SHEARMAN read a paper entitled: "The Application of Pathogen-Selective Methods of Culture in the Investigation of Foci of Infection in Arthritis" (see page 662).

DR. R. V. GRAHAM read a paper entitled: "Some Principles Underlying the Diagnosis and Treatment of Focal Sepsis with Special Reference to Arthritis" (see page 665).

DR. A. H. TEBBUTT, D.S.O., said that the subject of arthritis was a very difficult one, both from the clinical aspect and from the point of view of the patient. It seemed that the only organisms definitely identified with non-suppurative arthritis were streptococci and gonococci. He referred to the work of Rosenow in this connexion. It had become the vogue to regard focal sepsis as the primary cause of ill health, anæmia, endocardial and myocardial lesions and joint lesions. In the investigation of these conditions a thorough clinical examination was essential in order that focal lesions might not be overlooked. The clinician should not send the bacteriologist merely a pathological specimen. He thought that it was essential that the physician should consult with the bacteriologist and should discuss with him all his points of view in order that the bacteriologist might gain a clearer insight into the condition which he was required to investigate. Autogenous vaccines had been used very largely, more particularly in recent years. The results, however, had varied considerably. Sometimes they were good, sometimes indifferent. In supposed tonsillar or dental sepsis it was almost a routine practice to include several types of organisms in the vaccine. Since all these organisms could not be the cause of the disease, it was obvious that the principles of non-specific protein therapy were involved in vaccine treatment. Dr. Tebbutt stated that streptococci isolated from the stools were often without doubt normal for the digestive tract. Turning to the question of the pathogen-selective method, he stated that it seemed too easy and too simple to be true. He asked Dr. Shearman why clotted blood was always used for the cultures. He knew that serum or citrated blood would not answer in this particular method. It had been found by Walsh and Daphne Hindmarsh that clotted blood and hirudinized blood were more bactericidal than citrated blood. On the other hand, Dr. Tebbutt could not regard clotted blood as the same as blood circulating during life. Walsh and Hindmarsh had stated that it was always possible to get organisms to grow in blood media. He failed to understand why it was claimed that the failure of an organism to grow in clotted blood was necessarily due to a specific bacteriolytic power or that ability to grow meant the absence of a specific bacteriolytic substance. There was the question of whether human blood met with the growth requirements of any particular species or race of bacteria. He would not regard whole undiluted blood as a good culture medium. He had tried the pathogen-selective method in a few instances; the organisms that had grown in the patient's blood had been streptococci, staphylococci and the colon bacilli. He had inoculated sterile test tubes with at most one-half of the quantity of inoculum as had been used by Cronin Lowe, the organisms used being *Staphylococcus aureus* from a skin ulcer, *Streptococcus pyogenes* from the same lesion, *Staphylococcus albus* from the nasal passages, pneumococcus, a colon bacillus from a pathogen-selective culture and a chromogenic coccus from the nose. Approximately five cubic centimetres of the untreated whole blood of three normal adults had been added separately to each inoculum, making eighteen tubes in all. After twenty-four hours subcultures had been

made on solid media and the organisms had been recovered from every tube. Though no quantitative method had been employed, it was thought that multiplication had occurred in each tube. The results failed to demonstrate any particular selective action of the blood of three people upon six different bacteria of human origin. The pathogen-selective method of Solis Cohen and Cronin Lowe seemed to him to be a crude method and it was difficult to draw conclusions from the results obtained. If it was desired to investigate the specific bactericidal action of any particular sample of blood he would naturally use fluid blood or serum and add to it falling numbers of the bacterium. Or he would use the opsonic technique. He noted that many of Dr. Graham's patients had recovered after removal of septic foci without vaccine therapy. He would ask Dr. Graham if he did not think some of his cures after removal of the focus and vaccine treatment, with the use of the pathogen-selective method, might not also have been cures after removal of the septic focus alone. He was afraid that this method would be found to fall short of the claims made by its protagonists. It was not yet based on a sure foundation of careful experiment. They might wish that such a rough and ready, easy method would be reliable, but Nature guarded her secrets more jealously. Probably the most important work on arthritis had yet to be done. The discussion had been useful in demonstrating how little they knew of the properties of clotted blood as a culture medium.

DR. J. HOETS stated that he was interested in the matter from a clinical point of view. The arguments of the bacteriologist left him more or less in doubt, although he admitted the possibilities of the case put forward by them. He thought that the method of attempting to discover whether the organism in any focus was responsible for the arthritis was worthy of trial. One advantage of the method was that it could be applied without experimenting on the patient himself. He, Dr. Hoets, had not had as extensive an experience as Dr. Graham with the method, but he recognized that there were many facts in support of the theory. He spoke of a patient, a girl, with early rheumatic arthritis; there was swelling of several joints and pain of a few weeks' duration. On clinical examination the only lesion found was an unhealthy appearance of the tonsils. Nothing had been discovered on dental examination. The tonsils had contained pus. An examination had been carried out by pathogen-selection of the urine and faeces, but nothing abnormal had been found. None of the organisms grown had come through. It had been found that the patient had a profuse cervical discharge. She had been subjected to gynaecological treatment and this had resulted in the immediate improvement of her joint conditions.

In regard to the standard of cure referred to in Dr. Graham's paper, Dr. Hoets thought it was most difficult to speak of cure in chronic arthritis. He was loath to regard any patient as cured even when all the symptoms had disappeared. He asked Dr. Graham if he could suggest some definition of cure in this connexion.

DR. L. UTZ thanked the readers of both papers and stated that the paper by Dr. Graham had been of special interest. Dr. Tebbutt had asked why clotted blood was used. It had been found that the bactericidal action of the patient's blood was lost if citrate or oxalate of soda were added. The cultures were made not by inoculating clotted blood, but by placing the inoculum into the tube and pouring the blood on the inoculum. The blood clotted in the tube. Dr. Utz stated that he had not grown a staphylococcus on any one occasion by this method. It was his practice to investigate several foci at the same time in one patient. When this was carried out, he had found that a streptococcus would occasionally come through from more than one focus. It was by no means uncommon after teeth that were infected had been extracted, to discover the same organism at a later date in the stools. He thought that the pathogen-selective method was one to be highly commended and he claimed that the results so far were excellent.

DR. D. J. GLISSAN welcomed the introduction of this method of isolating the causal organism of arthritis.

It provided a legitimate basis for the endeavour to cope with focal sepsis. Hitherto focal sepsis had been rather a menace than a blessing. He deplored the large number of toothless people who bore witness to the prevalence of a fashion. It remained to be seen whether the pathogen-selective method would survive. Much useful clinical work could be done in connexion with it and he thought that it might be ten to fifteen years before the final verdict would be given. Dr. Graham had carried out a colossal amount of work of a very valuable kind. It was disappointing, however, that he had not differentiated the forms of arthritis in his paper. He, Dr. Glissan, distinguished sharply between rheumatoid arthritis and osteo-arthritis. He had not made any bacteriological investigations, but he had carried out close clinical study for some years. From the clinical aspect rheumatoid arthritis and osteo-arthritis were as far apart as the poles. The former occurred in young persons who were obviously ill; many joints were affected and there was no doubt concerning the infective nature of this condition. On the other hand, osteo-arthritis was encountered in persons of middle age, usually robust, healthy people, many of whom had not had a day's illness. He regarded osteo-arthritis not as a disease any more than grey hairs, a wrinkled skin or cataract was a disease. Osteo-arthritis was a manifestation of a circulatory change associated with age. In his paper Dr. Graham had illustrated some of the vascular changes associated with certain types of articular lesions. Dr. Glissan raised the question of the effect of variations in blood pressure on the changes in the bone. Some American observers had noted large areas in the deeper layers with degenerative changes and had set up the hypothesis that this process was a necrotic one. It was quite possible that the necrosis would result from a cutting off of the blood supply. The osteophytic outgrowths signified the attempt on the part of the bone to regenerate. It was extremely frequent in joints which were swollen and painful as a result of osteo-arthritis to find changes that must have antedated the symptoms by long periods. Many joints exhibited changes without any symptoms. His view was that the onset of symptoms was due to the operation of what he had labelled a determining factor. This factor was most frequently trauma, either mechanical or functional. If focal sepsis played any part in osteo-arthritis, it was in the rôle of a determining factor. Pain was due to the inflammatory process supervening as a result of trauma or infection in a joint, but when it persisted after this process had subsided, it was attributable to structural changes in or about the joint. For example, in the hip joint the rounded head and cupped acetabulum tended to become flattened and to approach the plane type of surface in which adaptive movements could be carried out only in one plane. Dr. Glissan stated that whether they found the organism or not, it was still necessary to apply surgical methods in the treatment of severe forms of arthritis.

Dr. J. S. PURDY, D.S.O., stated that he saw end results of arthritis and of its treatment among the five thousand employees of the City Council. He was satisfied that sepsis was the primary factor, at all events in rheumatoid arthritis. In 1904 he had acted as a jackal to Sir Thomas Horder in London in securing cases at St. Pancras Infirmary for the investigation of the blood in rheumatoid arthritis. The gonococcus had been found in the blood of one of these patients. The removal of the septic focus often resulted in considerable improvement. The arthritis and the fibrositis improved. In conclusion Dr. Purdy referred to the giving of vaccines by the mouth. Excellent results had been obtained in South Africa.

Dr. L. J. A. PARR stated that he had long been interested in the subject of calcium metabolism and had also carried out some work in connexion with the pathogen-selective method. It had been stated by Warren that the common organism in rheumatoid arthritis was a staphylococcus and in osteo-arthritis as streptococcus. He referred to a patient whose tonsils and teeth had been removed on account of alleged focal sepsis, and notwithstanding the removal no improvement had taken place in the joint condition. The stools, urine, cervical discharge had also been examined. A *Staphylococcus albus* had been recovered from the stools and had grown on the patient's whole blood.

After six weeks' treatment with a vaccine made from the staphylococcus great improvement had taken place. In regard to the streptococci recovered from foci he found it necessary to put these through the sugar tests in order to differentiate the various types. As a rule he found five or six different types from the teeth. *Streptococcus salivarius* and *Streptococcus mitis* usually predominated. He had injected these organisms in small quantities into the knee joints of rabbits. A deposit of calcium salts had resulted after many months, particularly when the former was used. He suggested that the streptococci or their toxins were the direct causes of the deposition of the calcium.

While he agreed with Dr. Hoets that rheumatoid arthritis and osteo-arthritis were distinct types, he was sure that mixed forms and transition forms existed. Osteo-arthritis was a disease of young persons and not of elderly persons. He did not think that injury was an essential aetiological factor. The toxin caused the condition, although trauma acted as a determining factor. At times vaccine treatment failed to effect an improvement. Under these conditions diathermy and other physical methods, including orthopaedic treatment, were necessary to break down the thickened tissue. In conclusion Dr. Parr pointed out that it was rare to obtain the green streptococcus from the teeth or from the faeces, while the colon bacillus was almost invariably grown from the faeces. He was satisfied that staphylococcus was a causal organism in osteo-arthritis.

Dr. R. V. STORER called the attention of the readers of the papers to the fact that the prostate and the seminal vesicles were often sites of focal infection. It was an easy matter to exclude the prostate as a source of infection by examining the expressed fluid for pus cells. If present, he suggested that five cubic centimetres of the patient's blood should be inoculated with the fluid and the culture examined by the method described by Dr. Shearman.

Dr. F. S. HANSMAN thought that it was worth while to consider what was happening in the pathogen-selective culture media. Dr. Shearman had made it clear that the selective properties were distinct from the non-specific bactericidal powers of whole blood, in other words the selective properties were a function of clotted blood, that there was developed in the early autolytic products of blood a substance which had strong bactericidal powers to organisms other than the one that survived. If a certain organism by growing in some focus of the host was able to effect certain subtle changes in the organ known as blood, that organ when it began to autolyse, would develop a hypothetical substance potent in bactericidal properties to all other organisms except the specific one and that property, according to Dr. Graham, might not be manifest till the blood had been undergoing autolysis at 37° C. for six days. It was difficult to imagine that Nature would work in such a purposeless fashion. Dr. Utz had suggested that the method should be used without question, but he, the speaker, thought that a scientific method should stand investigation. It was interesting to hear that the disciples of Solis Cohen had gone farther than the master. Solis Cohen had nearly always got several organisms through, whereas one of the speakers had never failed to get one organism only. An analysis of the fifteen cases published by Solis Cohen revealed that *Staphylococcus aureus* which was well known to be a very hardy organism, had been present in eleven patients and had come through the blood culture in all eleven, its growth being augmented in eight, equally prolific in one and somewhat inhibited in two when compared with control cultures on blood serum. On the other hand the pneumococcus which was a relatively delicate organism, though present in four patients, had not survived in any of the blood cultures. Streptococci comprised a very variable group as regards hardiness, but they could be considered to be intermediate between staphylococci and pneumococci. Streptococci had been present in ten patients; they had passed through the blood with augmented growth in five patients or 50% against 77% in the case of staphylococci. In one patient the streptococcus had passed through without augmentation. In four patients the organism had been killed, that was the streptococcal organism was killed in 40% against 0% in the case of staphylococci. Solis Cohen considered

these results to indicate pathogen-selectivity. Dr. Hansman thought that clotted blood could be considered to provide a good non-specific medium to determine the hardness of an organism. Further work should be done to see if organisms that survived mixture with whole blood showed any other peculiarities as a group. Dr. Graham was very daring to deal with the immensely difficult subject of calcium metabolism. The function of ionic and non-ionic calcium was being investigated by some of the most able biochemists in the world, but so far very little of definite value had been determined.

Dr. Hoets had related a very interesting case, but he was waiting to be told that the organism from the cervix came through the blood; he had failed to say whether it did or not.

In speaking of his own clinical experience Dr. Hansman referred to a patient who had been greatly debilitated by generalized fibrositis and mild joint symptoms and had been referred for a gastric analysis. There was an almost total achlorhydria and the fasting residue contained a large amount of muco-pus. Cultures had been made on a blood-agar plate and different amounts of the same material that was used for sowing the plate, had been used for pathogen-selective cultures. Nothing had passed through any of the pathogen-selective culture tubes. However, a vaccine had been prepared from several strains of streptococci which had grown on the plate. The vaccine had been administered for three months and the patient had taken hydrochloric acid orally. The rheumatic manifestations had cleared up completely and the patient was most eloquent in affirming her general improvement. The test meal had been repeated, the acid curve was within normal limits and the muco-pus in the fasting residue had greatly diminished. Had he been a disciple of Solis Cohen, he might still have been exploring orifices for organisms.

In his reply Dr. C. H. Shearman was surprised to have heard Dr. Tebbutt challenge the method on the ground of an insecure basis. In his paper he had referred to the preliminary work and he had pointed out that it was based on observations of competent workers like Almoth Wright and Kolmer, which could surely be accepted. In regard to the question why clotted blood was used, he wished to point out that it was not clotted blood, but whole blood that was essential. The addition of citrate rendered the blood unsuitable. It was difficult to ascertain why this was so. The decreasing bactericidal power apparently depended on the clotting time. The work of Walsh and Daphne Harmsworth, mentioned by Dr. Tebbutt, was hardly comparable with this method of Solis Cohen. In Walsh and Harmsworth's work the viability of the organisms had been altered by preliminary culture. No one knew what was responsible for the phenomenon. It was certainly not the usual antibodies. Besredka had shown that the ordinary antibodies followed immunity and were not the cause of it. Lister, of South Africa, had shown that animals could be rendered immune before any immune bodies appeared. The phenomenon might be due to phagocytosis, but this was speculation. Dr. Shearman could maintain that they had to accept the fact even if they did not understand it. He could not understand Dr. Hansman's point of view. He asked him whether he would refuse to use the Wassermann test because no one had yet been able to explain what took place in a reaction. In regard to a comment that several organisms had come through, in his work he wished to point out that this held good only for the early stages of his experience. He had found that if sufficient inoculum were used, it was easy to induce almost any organism to grow in the patient's blood. The selection depended on the use of small quantities. He thought that this was due to the fact that with mass inoculation sufficient inoculum was introduced for all organisms to grow. Turning to the question of staphylococci he called Dr. Parr's attention to the fact that some of the Gram-positive diplococci were very like the *Staphylococcus albus*. This diplococcus probably belonged to the group which had been called the *Micrococcus deformans*. He disagreed with Dr. Hansman's suggestion that the selective power was inherent in the organisms. He was satisfied that it was a quality of the blood towards a specific organism. He agreed with Dr. Storer that the prostate should be

examined. In his experience infection of the prostate was more often secondary than primary. Dr. Utz had referred to the fact that more than one focus might be found to yield a growth when cultured by the pathogen-selective method. It was obvious that more than one focus frequently existed. Reference had been made to the connexion of achlorhydria with certain forms of focal infection. It was easy to understand that as long as the gastric secretion contained hydrochloric acid, it acted as a barrier to the bacteria. When the acid was absent, the bacteria passed without difficulty, hence a secondary focus was found in the bowel.

Dr. R. V. Graham in his reply reiterated that clotted blood had not been specified in any account of the pathogen-selective method. He referred to the instance of a patient with cervical arthritis who had been referred to a pathologist for pathogen-selective cultures from faeces and nasopharyngeal discharge. The pathologist had considered it necessary to prevent the blood from clotting and had added citrate. Three organisms had been recovered from each source and they had all survived culture on the patient's whole blood. On repeating cultures from the same sources, but using unaltered whole blood, the same three organisms had been recovered in A cultures, but a streptococcus alone survived B culture from the naso-pharynx and all organisms from the faeces failed to survive in B cultures. A vaccine prepared from this streptococcus gave rise to general and focal reactions in the naso-pharynx and the cervical articulations and the patient had improved rapidly. He had not claimed that the streptococcus was the sole cause of arthritis. In reply to Dr. Tebbutt he claimed that it was not sufficient to eliminate the septic focus and to employ a stock vaccine. He cited cases to show that a good result was obtained by using a vaccine prepared from the specific organism in desensitizing doses. He had been asked to define a standard of cure. The standard he had adopted was an arbitrary one, but he claimed that it was quite reliable. The requirements were that all the symptoms had disappeared after twelve inoculations of vaccine so prepared, that the patient was able to follow his occupation and that no relapses had occurred for a considerable period of time. In reply to Dr. Glissan he stated that he was inclined to the opinion that the pathological process underlying all forms of arthritis was essentially the same. He had frequently noticed that the response to an aetiological process varied considerably in different individuals. As a rule the changes in osteoarthritis were those of devitalization of the bone and were almost exactly similar to senile changes. He agreed that orthopaedic treatment was necessary in addition to the vaccine treatment. In his paper he had dealt with only one line of treatment. In conclusion he referred to the observations on the variation of calcium metabolism in connexion with various types of infection.

A MEETING OF THE OPHTHALMOLOGICAL SECTION OF THE VICTORIAN BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held on June 29, 1929, at the Eye and Ear Hospital, Dr. E. L. GAULT, the President, in the chair.

Chronic Dacryocystitis.

DR. W. KENT HUGHES read a short paper on the treatment of chronic dacryocystitis. He said that in his experience by far the greater proportion of chronic dacryocystitis lesions owed their origin to a nasal infection; therefore the first attention of the surgeon should be directed to the nose. First of all he should remove all possible source of nasal infection and then treat along the orthodox lines of syringing through the duct regularly.

If this did not make the condition clear up, he proceeded to adopt operative measures, but he did not remove the sac, a procedure which he regarded as an unjustifiable mutilation. He made an opening from the sac into the nose. Beginning with the usual semicircular incision, he opened right into the sac which in his experience was found very frequently to be full of polypi. All these were scraped out and the anterior sac wall freely sacrificed if necessary. The naso-lachrymal duct was then pulled up

as far as possible and cut off as low down as could be and a large piece chiselled away from the bony medial wall of the fossa until the nasal mucous membrane was exposed. A hole was made in this and the free lower end of the naso-lacrimal duct pushed through into the nose and held in place by one or two sutures.

The anterior end of the inferior turbinate was not interfered with. The points Dr. Kent Hughes wished to emphasize were these:

1. The nose must first be made healthy.
2. The anterior wall of the sac could be freely sacrificed with absolute impunity.
3. The bony opening into the nose must be a large one.
4. The anterior end of the inferior turbinate must not be touched.
5. The free removal of polypi from the sac was of undoubted benefit.

In the discussion which followed, the President, Dr. E. L. GAULT, asked if the operation completely cured all discharge.

Dr. Kent Hughes had found that it did so.

Dr. J. O'BRIEN asked if especially small needles were necessary.

Dr. Kent Hughes had not found them necessary if the bony opening were made big enough.

Dr. O'Brien spoke appreciatively of the use of styles in those cases in which the sac was greatly dilated but otherwise fairly healthy.

Dr. MAX YUILLE asked if Dr. Kent Hughes had had any experience of Pooley's operation in which an opening was made through into the nose and a bundle of catgut passed through and left *in situ*. The idea was that during the twenty-eight days necessary for the absorption of the catgut the opening became lined with epithelium and so remained patent.

Dr. W. J. L. DUNCAN stated that West claimed for his operation that in a series of 1,600 cases its result was a perfect success in 98%. The generally expressed experience of members, however, was that not only was it difficult to make an adequate passage by the employment of West's technique, but the passage, once made, showed such a tendency to close over again that the end result was rarely satisfactory.

Dr. Kent Hughes in reply said he objected to the use of styles because of the slitting of the canaliculus necessary for their introduction and the ease with which they could pass through into the lacrimal sac. He had no experience of Pooley's operation.

"Olla-Podrida."

Dr. W. L. DUNCAN read a paper entitled: "Olla-Podrida" (see page 674).

In thanking Dr. Duncan for his paper the President emphasized the amount of work its preparation must have necessitated and the pleasure its reading had given to all present.

Increased Intraocular Tension.

Dr. J. O'BRIEN showed a small child with an intraocular tension of 45 millimetres of mercury; otherwise there were no signs of buphthalmia.

It was felt that the patient could only be watched for the present.

Iridocyclitis.

Dr. E. PARNELL showed a patient suffering from iridocyclitis with increased tension which had been successfully treated by repeated paracentesis.

Aneurysm of Retinal Vessels.

Dr. Parnell also showed a patient who was suffering from a condition regarded as probably being aneurysm of the retinal vessel.

This was considered by the members probably to be a pulsating vein.

Retinal Changes.

Dr. ESMÉ ANDERSON showed a case of marked colloid changes in the retina. She also showed a case of embolism of the central retinal artery.

Congresses.

THE PAN-PACIFIC SURGICAL CONFERENCE.

BY OUR SPECIAL CORRESPONDENT.

THE PAN-PACIFIC SURGICAL CONFERENCE was held at Honolulu from August 14 to 24, 1929, under the auspices of the Pan-Pacific Union in cooperation with the Hawaii Territorial Medical Association. The Pan-Pacific Union is an executive body financed by the State and by several private individuals. Its function is to promote amity between countries bordering on the Pacific Ocean and to encourage intercourse between these countries on all subjects of common interest, in order to create a broader understanding. The machinery of the Union is used to arrange all preliminaries for any definite conference, after which the conference is controlled by office-bearers appointed by that conference. Financial assistance is also rendered by the Pan-Pacific Union.

Honolulu is the largest town in the island group of Hawaii and is situated on the island of Oahu. Its population is 104,000 out of a total population of 348,000 in the whole island group. This population is a very mixed one, being approximately 38% Japanese, 9% Chinese, 11% American, British, Russian and German, 16% Philippino, 6% Hawaiian, 3% Asiatic-Hawaiian, 5% Caucasian-Hawaiian, 9% Portuguese, Korean and Porto Rican each 2%, Spanish, Samoan 2%. Inter-marriage with the exception of the Japanese and Koreans is common, so that Hawaii is in fact the "melting pot" of the Pacific races.

The chief industries are the production of sugar and the culture of pineapples, good organization and cheap labour conditions making these both very successful. In addition there is a large American military and naval base.

The Australian members reached Honolulu on the *Aorangi* on August 8, 1929, and were met by Dr. Nils P. Larsen, the Chairman of the Congress, and others. The Pan-Pacific Union generously provided accommodation free of charge for unaccompanied members of the conference.

The inspection of the customs officials proved to be a hot, lengthy and unpleasant ordeal. Dr. Larsen had tried to overcome this by previously bringing all pressure from the Governor downwards to bear on the Customs Department. The local collector of customs is a Mormon woman from Utah and although the Australian members were present at the invitation of the United States Government, she refused to waive any formalities. The result meant waiting in a queue and then having to open every article of baggage and having it minutely searched. This procedure occupied over an hour and a half in a tin shed which added to the extreme heat. This happening was the only unpleasantness in a wholly delightful visit.

The conference commenced on August 14 and lasted ten days. The official opening was held in the Grounds of the Royal Hawaiian Hotel and consisted of a reception by the trustees of the Pan-Pacific Union, a pageant of flags of all nations represented at the conference, an address of welcome by the President of the Pan-Pacific Union and the handing over of the management to the surgeons. The representative of each delegation then conveyed greetings. Dr. Ralph Worrall spoke for the College of Surgeons of Australasia and Professor Osborne for the Government of Victoria and the University of Melbourne. There were members from Australia, Canada, China, Japan, Korea, Latin America, New Zealand, the United States of America; with the members of the Hawaiian Medical Association about 150 persons attended the conference.

The Governor of the Territory of Hawaii held an official reception the same evening, which concluded the proceedings of welcome.

The discussions began on August 15. A breakfast clinic was held at the Royal Hawaiian Hotel each morning from 7.30 till 9 o'clock. The subjects discussed at these clinics on the various days were abdominal surgery, eye, ear, nose and throat surgery, chest surgery, gynaecology, orthopaedic surgery, head surgery, industrial surgery and genito-urinary surgery. A chairman presided and after breakfast an informal discussion took place.

The other meetings were held in the Moana Hotel with two rooms in constant occupation. Meetings occupied the mornings from nine o'clock onwards. The afternoons with the exception of a demonstration of leprosy at the local receiving station and a clinical meeting at the Queen's Hospital, were occupied in social functions and visits to places of interest, such as the Ewa sugar mill and the pineapple factory.

On three evenings public meetings were held, when medical and hospital subjects of interest to the general public were dealt with by various speakers.

The eighteen symposia covered surgery in all its branches with the exception of gynaecology. The Gynaecological Club of America was represented by only one member, Dr. C. Jeff Miller, as the annual meeting of this club had been held earlier in the year elsewhere. Eighty papers in all were discussed and to allow of this the following procedure was adopted. No paper was read entirely, the author being allowed twenty minutes only. In this time he gave a synopsis with lantern slides or cinematograph films. Complete copies of the papers were available to the members previous to the meeting, so that the discussions which followed were not impromptu. Lantern slides or cinematograph demonstrations were frequently used, not only to illustrate conditions, but also to present tabular material.

The papers read were of interest and well presented, but many were of necessity simple repetitions of routine methods of diagnosis and treatment. Mention will be made in this place only of those revealing new ideas.

General Surgery.

In the first symposium on general surgery, Professor W. A. Osborne's paper, entitled "Some Applications of Recent Physiology to Surgery," stood out as the paper of the morning. In regard to anaesthesia he stated that more attention should be paid to retaining the patient's body warmth. In his own experiments an animal could be anesthetized deeply and continually for nine hours with chloroform without any loss of nervous and circulatory reaction, provided the body warmth was maintained. The exhibition of atropine prior to anaesthesia should be in moderation both as regards dosage and practice. Many people manifest an idiosyncrasy and its action in inhibiting secretion in the breathing tracts removes a natural protection and brings about a greater irritation. The position should be a naturally comfortable one. Most people did not sleep comfortably in the dorsal position with head extended and this position for induction probably tended to increase the excitement.

Regarding anociceptive surgery the lessening of shock by the combination of local and general anaesthesia had not been so successful as had been anticipated. This failure he attributed to the fact that the procedure, while lessening shock to the central nervous system, caused more tissue trauma. This tissue trauma released histamine, a poison which when absorbed, acted adversely. The obvious conclusion was to injure living tissue as little as possible.

Recent work had shown the dominant nature of the pattern of the nerves carrying impulses of a sensory nature. Some idea was being gained of the complexity of the pattern and pattern sequence in the motor nerves innervating a voluntary muscle. When a nerve was crushed, the proximal nerve fibres regenerated along their old paths with recovery of function. But when a nerve was cut, the regenerating fibre took the shortest course and the chances of it being along the old track were remote. After nerve section and suture the function was not good and the slowness of improvement was due to the laborious reeducation necessary in the central nervous system owing to the distorted pattern. The conclusion was that tendon transplantation was physiologically a

sounder procedure than nerve suture. In speaking of the irritability of smooth muscle, Professor Osborne said that asthma was an obvious manifestation of spasm. It was possible that smooth muscle in other organs was so affected that symptoms suggestive of organic disease were provoked. Migraine, renal and biliary colic and uterine dysfunctions might be due to this cause.

It was well known that a tissue immersed in or perfused with a fluid of a lower specific gravity would become water-logged and the cells would die, but it was not so well known that unless the fluid contained a colloid to balance the colloid within the cell wall, absorption of the fluid would continue. This physiological fact should be remembered in preparing artificial infant foods and antiseptic lotions for tissue irrigation. Professor Osborne regarded the views of Dr. Hamilton Russell and of Dr. Craig on muscle tonus after fracture were physiologically sound. Briefly they were that deformity due to muscular action might occur temporarily at the time of the fracture, but after this stage, if the contour of the limb were restored and the limb placed in the position of physiological rest, the action of the muscles as a deforming force could be ignored. The interference with circulatory function by sympathetic ramisection caused interference of function in the area involved. Kilvington had proved that ligation of arteries in stages produced better results with less risk of gangrene.

Professor T. S. Seo, of Japan, discussed the surgery of the hematopoietic organs with special reference to splenomegaly due to *Schistosoma japonicum* and to eumycetes. The fluke worm *Schistosoma japonicum* invaded the human host through the skin exposed to rice water in the rice fields. It was endemic in many districts in Japan and had been present in different districts for varying periods of time. This meant that infections of different durations could be investigated. The acute original infection lasted about three weeks and drug treatment was effective if properly administered at this stage. In the chronic stage the liver, spleen and intestinal wall were affected and until the author had success with splenectomy nothing had been of benefit. The surgical treatment had only recently been tried, but the beneficial results were sufficient to encourage him to continue this treatment. In splenomegaly due to eumycetes it was uncertain whether the fungus found by several observers in Egypt, Algiers and France as well as in Japan, was the primary infecting factor. Splenectomy was considered the best treatment, but again postoperative observation had not been of long enough duration to consider it a cure.

Surgery of the Nervous System.

In the second symposium Dr. George W. Swift discussed the dural venous sinuses and choked discs. After discussing the variations found in the venous sinuses and their embryological formation, he stated that the occurrence of choked discs was caused mechanically by damming up of blood by pressure on the sinus.

Professor Makato Saito, of Japan, considered the Röntgenological diagnosis of cerebral tumours. He adopted Dandy's technique for ventricle injection and found exact localization possible. To demonstrate the arterial circulation of the brain he had used an emulsion of "Lipoidol" (ten to twenty cubic centimetres) injected into the superior thyroid artery. X ray photographs were then taken and abnormalities in contour were clearly demonstrated. Study of these abnormalities assisted in the localization of tumours. No ill effects had been noted after these injections.

Dr. Steele Stewart, of Los Angeles, offered an explanation of the effect noted following ramisection for cortical rigidity. He disagreed with Royle's explanation that ramisection reduced muscle tone *per se* and also with Orbell's belief that the force and amplitude of contraction were caused by sympathetic action and that it also enhanced the rapidity of development of tension. He suggested that the effect was produced by the section of the nerve fibres controlling the blood vessels of the spinal cord. He considered that the vessels were persistently constricted in this condition which was the cause of the spasticity.

Goutre.

The third symposium was on goutre; Dr. David C. Hall, of Seattle, read a paper on the incidence and prophylaxis of endemic goutre in the north-west of the United States of America. He quoted statistics on 30,000 university students and 8,000 school children over a period of twenty-one years. In recent years education and the distribution of iodine tablets and iodized salts had resulted in a reduction of 40% in incidence. The medical and surgical aspects of the thyroid gland were discussed without revealing anything new. Dr. John S. Lundy reported on the methods used at the Mayo Clinic in inducing anaesthesia for these operations in the year 1928. General anaesthesia alone had been used for under 5% of the patients. Local anaesthesia had been employed alone in 20% and a combination of local and general in the remaining 75%. Nitrous oxide, ethylene with or without ether were the general anaesthetics and carbon dioxide was used in 80% of these patients who had had gas and ether. The combined form of local and general anaesthesia was deemed to be the most suitable. The local technique consisted of infiltration down to the transverse processes of the second, third and fourth transverse processes of the cervical vertebrae. General anaesthesia was used only for a short period while the gland was being freed.

Cancer.

The fourth symposium was upon cancer and was disappointing in that two papers listed for discussion were not read in the absence of their authors and the others were on the orthodox surgical technique for radical removal. Dr. Frederick L. Hoffman, of Newark, New Jersey, discussed the value of cancer statistics and considered that general statistics were of little value. The data required were the detailed reports of the organs and parts of organs involved, the racial constituents of the population, the follow-up statistics of the results of treatment in detail.

Intestinal Surgery.

Surgery of the lower segments of the intestines was the subject of the fifth symposium. Dr. Alfred J. Murrieta, of Los Angeles, presented a paper on Houston's valves, their relation to the aetiology of rectal constipation and other pelvic dysfunctions. He gave the results in 150 patients treated. Whether or not his opinions agreed with established physiological facts was open to question. Dr. John S. Lundy expressed his opinion that ether administered by the open drop method was still the most satisfactory anaesthesia for lower abdominal operations and was the safest for general use. If local anaesthesia was to be used, the preliminary hypnotic medication must be potent.

Surgery in Industrial Life.

Dr. Clarence E. Fronk, of Honolulu, was chairman for the sixth symposium of industrial surgery and read a paper on the problems in modern industrial surgery. Since industrial insurance had become a universal procedure, medical practitioners had been devoting their attention to the treatment of conditions encountered in industrial employment. If industrial work was being carried out, it was essential to separate it from general practice by having separate accommodation and a regular staff. Examinations should be thorough and pains should be taken to explain the findings carefully to the patient, as the patient's confidence was essential. In the final assessments of the percentage of disability it was best to have the opinion of consultants if any doubt existed before the claim was considered by the official assessing tribunal. These tribunals had to rely mainly on surgical reports and it was desirable that a unanimous agreement of the percentage of disability should be presented. Diverse surgical opinions brought the profession into disrepute, prolonged the court procedure and adversely affected the patient's psychology. The industrial patient's psychology was very important. The pain or discomfort in an injured area should be forecasted by the surgeon, especially when the patient was resuming the use of the affected part. He

emphasized that the symptoms were inevitable, that delay in the resumption of work would not prevent them from appearing and that the more the part was used within reason, the shorter the period of discomfort would be. In fractures the shortest period of splinting compatible with union was desirable. Head injuries were probably the most serious causes of disability encountered. Conservative treatment was found to be the best. He assumed that all the patients were in a shocked state and that the shock should be treated and the patient be allowed to recover from this before surgical measures were instituted. In fractured skulls the intracranial injury was the important factor; the key to this was the diastolic blood pressure which was always lowered, even though the pulse rate might be normal for a time. In traumatic wounds the routine of a general anaesthetic and a thorough cleansing and excision of damaged and soiled tissues should be carried out.

Dr. Le Roy Brooks, of San Francisco, showed a coloured motion picture of his technique in blood transfusions which he had carried out over one thousand times.

Dr. E. D. Roberts has used kukui tree as a base for "Lipiodol" emulsions for injection into cavities prior to X ray examination. This tree grew abundantly in the Hawaiian Islands and the cost of the oil was very small compared with the other bases previously used. It was found to be better in action and to cause no ill effects.

Surgery of the Thorax.

The seventh symposium was upon bronchoscopy and thoracic surgery. Dr. Emil Holman, of Stanford University, discussed post-operative intrapulmonary abscess. An analytical study of 1,908 cases showed that 29% followed some operation and of the latter tonsillectomy was the operation in 50%. His experimental work showed that intrapulmonary suppuration could occur equally by the intrabronchial and intravascular route. Further, that a sterile intrapulmonary embolus became a septic embolus if the animal was in a bacteræmic state. No experimental evidence was available to support the theory that the lymphatic system was a factor in the production of intrapulmonary suppuration.

Dr. Ralph C. Matson described the cauterization of adhesions in an artificial pneumothorax by the Jacobaeus-Unverricht method of closed pneumolysis. He had carried out this procedure on 150 patients and detailed the indications, procedure and end results. The galvanic cautery and diathermy knife were used. Haemorrhage had occurred on three occasions and diathermy had been a great help in controlling this.

Dr. Leo Eloesser drew attention to chronic bronchial stenoses, a condition which had not received much consideration in comparison with acute stenoses.

Dr. Otis F. Lemson described the surgical treatment of cardiospasm. This consisted of manual dilatation of the cardiac orifice of the oesophagus from below and in the presence of a pendulous diverticulum, the most distal part of the pouch was anastomosed to the stomach. Dr. J. A. Webber, of Seattle, urged the use of bronchoscopy in lung suppuration in all stages, claiming rapid and complete cures by bronchoscopic aspiration even in the acute stages. Dr. Harry H. Kerr, of Washington, detailed a new method of thoracotomy for intrathoracic tumours. He divided the sternum vertically by trephine and Gigli saw from the first to the sixth intercostal space. Lateral incisions in these spaces allowed the skeletal structure on the affected side to be prised laterally, giving a larger exposure without destruction of ribs than in the usual method. His technique was similar to that published by Dunhill in the English literature about two years previously.

Hospital Standardization.

The eighth symposium was upon hospital standardization. The subject was dealt with fully, the history of the movement and its progress up to the present being detailed. The principles were the same as laid down by Dr. MacEachern who had visited Australia some two years previously. He was the chief speaker on the subject at the conference and also had on view an excellent exhibit of models and photographs of the magnificent hospital

buildings built or being built in the United States of America. The authorities building these hospitals had consulted the hospital standardization department of the American College of Surgeons and this department, with its previous experience, was competent to give valuable advice in all departments, such as building, organization, staff selection and finance. The universal practice was the community hospital with accommodation ranging from the most luxurious suites of rooms to many public wards under the same organization and management. The patients received accommodation in accordance with their financial means, the profits from the private portion more than balancing the public portion. The Queen's Hospital at Honolulu was a modern and most excellent example of this scheme. In this hospital the public wards were open to the indigent, but the hospital received payment for each patient in these beds direct from the government which reserved to itself the right to inquire into the financial position of the patients. The American College of Surgeons had recently undertaken the standardization of surgical sponges and dressings. Inquiry at the larger American hospitals revealed the fact that over two hundred different types of sponges and dressings were being used, involving waste of labour and material. Experiment and discussion had reduced this number to seven standard sizes and shapes.

Surgery of the Gall Bladder.

The ninth symposium dealt with gall bladder surgery and six papers were presented. Dr. John S. Lundy, of Rochester, in discussing anaesthesia for operations on the upper part of the abdomen was of opinion that a routine method of inducing anaesthesia should be avoided. The needs of the individual patient should be considered, the requirements being optimal relaxation with quiet respiration. Dr. Stanley H. Mentzer, of San Francisco, considered that cholesterosis of the gall bladder was essentially a non-inflammatory condition which occurred in patients who suffered from general disturbance of their fat metabolism. Dr. C. J. Johanneson, of Washington, spoke upon cholecystography. He had administered tetraiodophenolphthalein by the mouth in a cereal and had examined the gall bladder of one hundred subjects as well as the intestinal tract. He was convinced that this method was superior to giving the dye in capsules. Failure to reveal a gall bladder shadow was the result of faulty technique. Since the completion of this series he had used a "tetrado" emulsion in grape juice and had found it more effective. In the series discussed the findings had been substantiated at operation in 98% of the patients. In the other 2% stones had been found in the common bile duct which had not been visible in the skiagrams.

Dr. Andrew S. Lobingier, of Los Angeles, spoke of the surgery of the gall bladder and bile ducts and maintained that it demanded great practical experience to deal adequately with the pathological conditions encountered. Experience had established the part played by remote infections; it was necessary to deal with these infections to insure success. The occasional operator should not attempt this work.

Ophthalmic Work.

Dr. Lloyd Mills, of Los Angeles, the chairman of the tenth symposium, opened the proceedings with a paper on the prevention of complications of cataract. The main causes of complications were fear, pain, defective incisions, open or unprotected wounds, infections and retained lens material. Fear could be overcome by adequate mental preparation for the operation, as it was caused by ignorance or dread of what the ordeal would be. Pain could be avoided by adequate anaesthesia. He used the Van Lindt facial nerve blocking method with 4% cocaine solution for instillation; the anterior chamber was filled with sterile 4% cocaine and adrenalin solution after the incision. There was practically no postoperative pain in wounds covered by a flap and sutured. The size of the incision could be gauged only by experience; many complications were caused by incorrect incisions. Infections under modern methods should not occur if the surgeon made sure before the operation that the tear ducts were

patent and the conjunctiva was normal. The difference between the final results of intracapsular and extracapsular operations in the hands of equally experienced surgeons who used full closure of the flap by suture, depended solely upon the reaction of the eyes to retained lens substance.

Sir James Barrett, of Melbourne, discussed the visual standards desirable for mariners and railway officers. He emphasized that a careful check should be kept on these persons with annual reexaminations up to the age of sixty.

Dr. Forest J. Pinkerton presented a paper on the surgery of the leprosy eye. He reviewed his own experience of 700 patients. Early operation upon the lid in *orbicularis* paralysis was imperative and should be done before corneal changes had begun. Great disappointment resulted from delayed treatment, either medical or surgical. "Novocain" infiltration was the best for all operations of the leprosy eye.

Gastro-Intestinal Surgery.

The eleventh symposium was upon the surgery of the stomach and intestines. Dr. Y. S. Lee, of Korea, had treated two hundred amebic liver abscesses, 181 in males and nineteen in females. Aspiration and subcutaneous injections of emetine were considered to be the best treatment. Open operation had been almost entirely abandoned. Acute perforations of peptic ulcers, operations on the duodenum and surgical treatment of the large intestine were also discussed.

Operations on the Ear.

Surgery of the ear was the subject of the twelfth symposium. Dr. Robert Puelleine, of Adelaide, stated that in chronic progressive deafness the presence of a posteriorly placed spur of the nasal septum was a frequent causative factor and claimed beneficial results from its removal.

Dr. Ralph A. Fenton, of Portland, recorded his experience of the value of "Dichloramin T" in the dressing of mastoid wounds. He had used this treatment for eleven years and urged its adoption. His formula was a 2% dilution of "Dichloramin T" in "Chlorosane." It was claimed that this solution inhibited bacterial growth and hastened convalescence.

Dr. A. T. Wanamaker, of Seattle, discussed lateral sinus thrombosis, the commonest complication of mastoiditis. In the city of Seattle in four years it had been encountered in 26 out of 487 patients operated upon for mastoiditis. Great value was placed upon the leucocyte count according to the formula of Arneth and Schilling, which depended on the assumption that the presence of mild infection produced an increase in staff forms, while in severe infections young cell forms were manifest. He believed in trying the jugular vein in all circumstances, but did not sever and resect it unless there was evidence of clotting in the vein. The lateral sinus was dealt with on orthodox lines. Seventeen out of twenty patients treated in this way, had recovered. Dr. J. E. Strode, of Honolulu, showed several patients with congenital fistula of the ear. He had traced in all a strong hereditary tendency.

Plastic Surgery.

In the thirteenth symposium on plastic surgery of the face and mouth, Dr. Don H. Palmer, of Seattle, demonstrated his method of treating "cauliflower" ear. The excess of tissue was removed by curettage and dissection, the wound closed except for a small drain and a plaster cast applied to the auricle and left *in situ* for ten days. This splint prevented post-operative effusion. Many lantern slides of these and other facial deformities before and after treatment were exhibited. Dr. H. O. Barnes, of Los Angeles, spoke on plastic operations. His treatment of the facial deformities was in accordance with orthodox methods. For pendulous breast he employed a method that had been devised in France. A circular incision was made around the nipple just outside the areola. A similar incision of the same length was made in the skin at the normal nipple site. Through these incisions the breast was dissected free from the skin in all directions. The

nipple and areola were then pushed up and delivered into the upper incision and sutured there. Excess of skin and fatty tissue below was excised and the skin edges were sutured in a line following the inferior order of the breast.

Urological Problems.

Surgery of the kidney and bladder was discussed in the fifteenth symposium. Dr. Alexander B. Hepler, of Seattle, gave his opinions on the pathogenesis of solitary cysts of the kidney. He had done much original work on the subject before reaching his conclusions. Dr. S. Harry Harris, of Sydney, gave a description and showed a motion picture film of his operation of suprapubic prostatectomy with complete closure. Complete closure had been carried out in 104 of his last 112 consecutive operations for benign prostatic hypertrophy. Of the one hundred and four patients two had died, one from pneumonia on the sixth day and the other from inanition on the forty-ninth day. Reactionary hæmorrhage had occurred only twice and secondary hæmorrhage twice among the earlier operations. The operation accomplished by suture complete and permanent control of hæmorrhage, obliteration of the prostatic cavity and reformation of the prostatic urethra.

Fractures.

The sixteenth symposium was on fractures. Non-union was dealt with by Dr. L. R. Chandler and Dr. James T. Watkins, of San Francisco. They described the method of treatment evolved by the late John Cowan. They claimed that in a series of forty-seven fractures only one failure had occurred. The method had resulted from extensive experimental work on animals. The periosteum with a thin layer of bone attached was separated at the site of the ununited fracture on each fragment. The whole fibrotic union was removed and the medullary cavities were uncapped with a gouge and troughed. The ends of the periosteum were then stitched together with a small shaving of rib in the cavity. In the fractures in which the treatment had failed, non-cellular bone from the tibia had been used instead of rib and its non-vascularity was considered to be the cause of failure. Dr. Edgar L. Gilcreest in his paper considered that skilled traction in fracture treatment did away with the necessity for open operations.

Orthopædic Surgery.

Orthopædic surgery was the subject of the seventeenth symposium. Dr. Norman D. Royle, of Sydney, presented papers on two subjects. In the first he traversed the subject of tendon transplantation with autoplasmic tendon sutures. The second was a motion picture demonstration of the increase in muscle tone following stimulation of the sympathetic nervous system. Dr. John C. Wilson and Dr. A. L. Craig, of San Francisco, advocated extra-articular fusion of the tuberculous hip joint, claiming that conservative treatment of the joint had not yielded favourable results. A good fusion could be obtained by the operation of ilio-femuroplasty which was fully described. Dr. Fred H. Albee, of New York, discussed the treatment of ununited fractures of the neck of the femur. He reviewed a series of his own cases and the operative procedures carried out in each.

The Fauces and the Nose.

The final symposium was upon surgery of the nose and throat. Dr. Richard Francis, of Sydney, discussed the surgical methods for dealing with affections of the tonsil. He preferred to use general anaesthesia by the intratracheal method for operations on this organ. He considered that admission to hospital was essential. Dr. M. C. Findlay, of Salem, described his new technique in adenectomy in which he advocated a to and fro movement laterally of the adenotome in the course of removal. Dr. O. R. Gullion, of Eugene, had frequently found the ethmoid and sphenoid sinuses most unhealthy in apparently healthy noses. His attention in each case had been directed to the sinuses by the eye condition in which persistent pathological changes unrelieved by routine eye treatment, were found.

It is impossible to speak too highly of the excellent arrangements of the social functions and the whole-hearted

hospitality of the members of the Hawaiian Territorial Medical Association and Mr. Alexander Hume Ford, Director of the Pan-Pacific Union, who acted as hosts. The programme was a most pleasant one. In addition the hosts by a careful organization were able to supply all the visiting delegates with transport to and from all social functions, no matter at what late hour they ended. The official functions were the opening and the Governor's reception previously mentioned, a Japanese dinner at which the Japanese practitioners in Hawaii were hosts, a Chinese dinner given by the Chinese Chamber of Commerce, and a Hawaiian dinner given by the Hawaiian Territorial Medical Association. After the Chinese dinner a theatre party was given by the Chinese practitioners; the whole performance was rendered by Japanese, Chinese, Korean and Philippino artists. Following the Hawaiian dinner a Hawaiian entertainment took place. The Pan-Pacific Union held a magnificent pageant of all local nationalities followed by afternoon tea. In addition the foreign delegates were guests of the Union at luncheon and at the science evening. The Sunday of the conference week was taken up with a delightful picnic at Lanikai Beach, situated twenty-five miles from Honolulu. This beach is used as a week-end resort and Dr. F. J. Pinkerton kindly placed his cottage at the members' disposal. Proceedings commenced with a *Hukilau* (drawing the net) when the Hawaiian fishermen had a most successful catch. Swimming occupied them until luncheon when they were the guests of the Honolulu Chamber of Commerce at a most enjoyable alfresco meal. Lanikai Beach closely resembles the Sydney beaches, but the warmth of the water and the entire absence of sharks and undertow made the swimming all the more enjoyable. The final function of the conference was a lunch given by the Chairman, Dr. Nils P. Larsen, after which a general meeting decided to hold a Pan-Pacific surgical conference every three years; the next one will be held at Honolulu in 1932. The other functions were very happy informal parties given by many of the local medical practitioners and their wives. Delegates were made honorary members of the Honolulu clubs during their stay, a courtesy greatly appreciated.

Medical Societies.

THE CLINICAL SOCIETY OF THE HOSPITAL FOR SICK CHILDREN.

A MEETING OF THE CLINICAL SOCIETY OF THE HOSPITAL FOR SICK CHILDREN was held at the Hospital for Sick Children, Brisbane, on June 27, 1929, Dr. A. V. MEEHAN in the chair.

Encephalitis.

DR. H. MATHEWSON showed a female patient, aged one year and seven months, who had been admitted on June 15, 1929, with a history of influenzal symptoms and severe cough for the previous fourteen days. The child had been very drowsy, was a bottle-fed child and was still on the bottle. On the day of admission, when standing, she had suddenly fallen down and knocked her head and had appeared dazed for a time. She had vomited after the fall, but had had no convulsions. The bowels had been well opened.

On examination the colour had been good and the child had appeared well nourished. She had been very drowsy and irritable when moved. She had taken no notice of signs and it had been at first thought she was blind, but it was later concluded that this was due to the cerebral condition. The pupils had been equal and light reaction had been sluggish. Knee jerks had been exaggerated and there had been some neck rigidity. The chest, heart and abdomen had been normal. On the second night after admission the temperature had risen to 39.4° C. (103° F.), but had been normal since then. For a few days it had been thought she might die, but she had taken a turn for the better. X ray examination had revealed no fracture of the skull. Spinal puncture had yielded a clear fluid under increased pressure, sterile and normal in every

way. A Wassermann test had not been carried out. As regards progress, the child had slowly got worse and had refused food. A provisional diagnosis of encephalitis had been made.

Congenital Syphilis.

Dr. Mathewson's second patient was a child, aged fourteen months, who had been admitted on March 9, 1929, with a diagnosis of rickets and sweating freely. The child's weight had been stationary; there had been no bony deformities and the Wassermann test had failed to yield a reaction. Dr. Mathewson had thought of syphilis and had treated the child as a congenital syphilitic, first with inunctions of mercury over a period of six weeks and during this time there had been no improvement. The child then had been given intramuscular injections of "Kharsulphan"; it had had nine of these and had responded well. The erythrocytes had numbered 2,600,000 and the leucocytes 7,600 per cubic millimetre. The weight on admission had been five kilograms (eleven pounds four ounces). It had risen to 5.45 kilograms (twelve pounds four ounces) and then had fallen to 4.3 kilograms (nine pounds eight ounces). It had then begun to rise gradually, had risen to five kilograms (eleven pounds four ounces) and there had been a steady increase since then.

Dr. Mathewson said that this case showed that inunctions alone did not improve every child, whereas inunctions combined with a drug similar to "Salvarsan" did improve them. There had been a time when intramuscular injections used to cause pain and abscess formation, but this preparation, "Kharsulphan," could be given without pain.

Dr. SHIRLEY LANE showed a number of patients with congenital syphilis.

The first was a girl, aged eleven years, a myxoedematous child, the mother being also myxoedematous. The child's response to the Wassermann test was "++." She had had one course of "Sulpharsenol" and mercury and iodide and mercury inunctions. The Wassermann test had not been carried out for a second time. In August, 1928, she had had acute nephritis. The mother gave a positive response to the Wassermann test. A sister, aged seven, and a brother, aged eight, gave no reactions.

The second patient, aged five years, was naughty and mischievous, would not talk and was of the mental age of two and a half. The weight was 15.3 kilograms (two stone six pounds) and was stationary.

In November, 1928, the response to the Wassermann test had been "++++." She had had one course of "Bismol," ten injections of three cubic centimetres, and mercury and iodides and mercury inunctions. In March, 1929, the Wassermann test had yielded no reaction. The family history was clear.

The third patient shown by Dr. Lane was aged seven, a very nervous child and highly excitable. He was suffering from erythroderma. He was occasionally "very tired." The systems were clear. The response to the Wassermann test was "++++." He was under treatment with mercury and iodides and mercury inunctions only and was much improved. Neither the father nor the mother gave a response to the Wassermann test. A sister, "N," aged eleven, gave a "++++" response; a sister, "V," aged fourteen, gave a "++" response; a brother, "A," aged seven, gave a "++++" response; a sister, "E," aged eight, gave a "++++" response. The children "N" and "E" both looked well and normal and were having treatment.

An Obscure Cerebral Condition.

Dr. S. F. McDONALD showed a male patient, aged four years and a half, who had been admitted on June 11, 1929, with a history of convulsions one week previously, since when the child had been feverish and drowsy. He had taken his food fairly well and had vomited twice at the onset of the illness. Two days before admission the mother had noticed that the right arm and leg were paralysed. The child had complained of headache and had had another convulsion just prior to admission. On examination the child had been stuporous and would not reply to questions, the pupils had been equal and had reacted to light and there had been no neck rigidity. The right arm

muscles had been hypotonic and the biceps jerk absent and the right hand had not moved at all. The right leg muscles had been hypotonic, the knee jerk present and the Babinski reaction present. There had been paresis of the right arm and leg. The left arm and leg had been normal and used freely. The heart, lungs and abdomen had been normal. In the right side of the face paresis had been present. Definite improvement had occurred in all muscles. The right side for a few days had been definitely spastic and rigid. During the last week the muscles of the right side had been much more lax, though the Babinski reflex was still present. It had looked as if the condition would clear up almost entirely. The child had been kept quiet and was improved. The provisional diagnosis was some cerebral lesion following convulsions or possibly anterior poliomyelitis attacking cells slightly higher up or else encephalitis lethargica.

Dr. ELLIS MURPHY remarked that the total lack of reaction to accommodation in the eyes seemed to him to point to encephalitis lethargica, as this was the part particularly picked out by the virus of encephalitis.

A Case for Diagnosis.

Dr. J. BOGLE, for Dr. Gavin Cameron, showed a patient, aged four years, who had been admitted on May 26, 1928, with a history of being ill for four days and complaining of pains in the knees and elbows. There had been no swelling of the joints. There had been no vomiting and the child had been feverish and drowsy.

On examination the child had appeared very ill, but nothing abnormal had been detected, except doubtful râles at the lung bases. It had at first been thought the condition might be one of pericarditis or septicaemia, but the heart had appeared normal. The abdomen had been large and flaccid and the spleen not enlarged. The blood urea had been thirty milligrammes per hundred cubic centimetres.

Blood examination had yielded the following information:

Erythrocytes, per cubic millimetre	2,900,000
Hæmoglobin value	58%
Colour index	1.0
Leucocytes, per cubic millimetre	14,000
Neutrophile cells	69%
Lymphocytes	29%
Large mononuclear cells	1%
Eosinophile cells	1%

The erythrocytes had manifested polychromasia and punctate basophilia.

Several blood cultures had been carried out and all had been sterile except that on one occasion *Bacillus subtilis* had been found. X ray examination of the chest had revealed some enlargement of the heart, but no other abnormality.

Urine, examined microscopically, had contained large quantities of pus, an occasional red cell, but no casts. Chemically a slight trace of albumin had been present. The kidneys had been examined by X rays, but neither stone nor pyonephrosis had been discovered. The Wassermann test had yielded no reaction. The child had had frequent high temperatures, swinging from 40° to 36.9° C. (104° to 98.4° F.). There had been no rigors and the child was becoming progressively worse. The only treatment so far had been large doses of citrates and the urine was alkaline. The cause of pus in the urine was not clear.

The condition was discussed, but no diagnosis was made.

Lead Poisoning and Deformity of the Foot.

Dr. A. V. MEEHAN showed a patient, aged eleven years, suffering from plumbism, who had been admitted for lengthening of the tendo Achillis on both sides.

The patient had first been seen at the out-patient department by Dr. Meehan on January 9, 1922, when she was four years of age. There was a history of lead poisoning with convulsions for the previous two years. She had lost the use of her legs and arms during the last three months. She had been admitted to a medical ward for treatment.

On June 15, 1922, it had been noted that she had very weak extensors of the legs and that contraction of the tendo Achillis was present. She had been considered too

weak for operation, the kidney function being poor. On February 1, 1923, the blood film had manifested definite punctate basophilia. On May 9, 1929, the urine had contained a cloud of albumin. Examination of the blood had revealed the following information:

Hæmoglobin value	89%
Colour index	1.0
Leucocytes, per cubic millimetre	8,900
Neutrophile cells	42%
Lymphocytes	48%
Eosinophile cells	10%

The red cells had manifested no abnormality. The urea concentration test figures had been 1.5%, 1.5% and 1.7%.

On June 7, 1929, the blood urea had been 88 milligrammes per hundred cubic centimetres and the figures for the urea concentration 1.7, 1.9 and 1.7. The urine had contained a few granular and hyaline casts, a few pus cells and red cells. The blood count had been as follows:

Erythrocytes, per cubic millimetre	3,200,000
Hæmoglobin value	65%
Leucocytes, per cubic millimetre	12,300
Neutrophile cells	68%
Lymphocytes	30%
Eosinophile cells	2%

A film manifested definite polychromasia, anisocytosis and punctate basophilia.

The child looked stunted and aged. She required a lengthening of both *tendines Achillis*. There was slight *valgus* deformity in the right foot; in the left foot, in spite of the contraction of the *tendo Achillis*, all the extensors were working.

Dr. Meehan said that if these patients were treated at once, a deformity was rarely seen and no deformity should ensue.

Dr. Meehan then demonstrated how a lengthening of the *tendo Achillis* should be done. The tendon should not be cut right across, as then a *calcaneus* deformity might follow. In tiny babies with club feet he sometimes cut the tendon right across, but in all other circumstances he did a lengthening. He demonstrated how the integrity of the sheath and the tendon were maintained.

Dr. S. F. McDONALD then discussed the difference in the blood picture in this child. On May 9, 1929, the hæmoglobin value had been 89% and on June 7, 1929, 65%. He thought that if these children were looked after and given a rest, they would recover to a large extent, but any shock would set them back. For example, they might go on well till the ages of nineteen to twenty-three and then get some setback by an infection. Pregnancy caused a complete setback and he considered that if this child grew up and were to be married, she should not be allowed to become pregnant.

He considered that if the urea concentration were consistently 1.5 or below, trouble would follow; but this child had improved since coming into hospital. With regard to the blood urea, he considered that so long as it was below one hundred milligrammes per hundred cubic centimetres there was no need to worry, but anything above one hundred milligrammes was serious. He asked whether the blood picture was due to an outpouring of lead from the bones or to some other condition.

Hare Lip.

Dr. J. BOGLE showed for Dr. S. P. Dixon a child, aged three weeks. Its weight at birth had been 3.1 kilograms (seven pounds). Its present weight was 3.8 kilograms (eight and a half pounds). A brother of the child had been born with a single hare lip and cleft palate and had been operated on by Dr. Dixon. This child had been weaned at the Lady Bowen Hospital and had been put on milk, water and sugar. Examination revealed double lateral hare lip, with projection forwards of the premaxilla. Fissures on either side of the premaxilla led to medium clefts of hard and soft palate. At the time of the meeting the child was undergoing weaning for several days prior to operation on the hare lip.

Correspondence.

THE LIBRARY PROBLEM.

SIR: Please allow me to draw attention to an error in my letter on "The Library Problem," as published in your last issue. The word "must" on the twenty-seventh line from the top should be "not" and the sentence should then read: "Some of the professors, not all, retain them (books) for an unreasonable time." I dare say my bad caligraphy was responsible for the error.

Your correspondents may also be glad to learn that Mr. Pitt, of the Melbourne Public Library, has now done for all the States what he had previously done for Victoria, in that a work by him entitled: "A Catalogue of Scientific and Technical Periodicals in the Libraries of Australia," is now being printed and will very soon be issued.

Yours, etc.,

JAS. BOOTH.

North Melbourne.
October 1, 1929.

STEINACH'S OPERATION.

SIR: I would deem it a great favour if any of your readers would give through the medium of the journal their experiences with the results following Steinach's operation, especially mentioning the results on (a) the *vita sexualis*, (b) any neurotic or psycho-neurotic symptoms.

I have had the opportunity to watch two cases in which this operation has been done and in neither person has there been any alteration either physiologically or psychologically. The only result has been that it has enabled both to cease the pernicious practice of *coitus interruptus*.

Yours, etc.,

PAUL G. DANE.

110, Collins Street, Melbourne.
October 25, 1929.

Proceedings of the Australian Medical Boards.

QUEENSLAND.

THE undermentioned have been registered under the provisions of *The Medical Act of 1925*, of Queensland, as duly qualified medical practitioners:

Carseldine, Malcolm Wesley, M.B., B.S., 1929 (Univ. Sydney), Brisbane.
English, Peter Bede, M.B., B.S., 1927 (Univ. Sydney), Capella.
Harrison, Bruce Lister, M.B., B.S., 1929 (Univ. Sydney), Brisbane.

Restoration to the Register:

Connell, Brydon Herbert Minton, M.B., Ch.B., 1913 (Univ. Melbourne), Brisbane.

THE ALEXANDER WILSON TESTIMONIAL.

A READY response has attended the inauguration of the Alexander Wilson testimonial fund which has been started by the members of the honorary staff of the Royal Prince Alfred Hospital, Sydney, to mark the appreciation of past and present students, resident and honorary medical officers of the services of Mr. Alexander Wilson on his retirement after forty-eight and a half years' service as chief attendant at operations. It is intended to close the fund at the end of November. Intending contributors are asked to send their cheques to Dr. R. A. Money, the Honorary Treasurer, 143, Macquarie Street, Sydney.

THE HERBERT J. MARKS MEMORIAL.

In consideration of the constant, painstaking and invaluable services rendered by the late Dr. Herbert J. Marks to the specialty of ear, nose and throat in the city of Sydney, both as an honorary medical officer in its hospitals and as a lecturer at its university, some of his colleagues are endeavouring to raise a fund in order to perpetuate his memory by the establishment of an annual prize at the University of Sydney.

His unflinching courtesy, his generosity in imparting his knowledge to his *confrères* and the enormous amount of free work which he has done for the families of the profession and the general public, are, we think, sufficient appeal in themselves.

Cheques may be sent to Mr. Selle, Registrar of the University of Sydney, and Mr. H. M. Beresford, Accountant of the University. When the fund is closed, a meeting of the subscribers will be called to ascertain their wishes as to the conditions of the prize.

Books Received.

BIOLOGICAL REVERSION AND HIPPOCRATIC ANATOMY, by Hubert Higgins, M.A. (Cantab.), M.R.C.S. (England), L.R.C.P.; 1929. London: H. K. Lewis and Company, Limited. Demy 8vo., pp. 159. Price: 7s. 6d. net.

RECENT WORK ON COLPORRHAPHY, RHEUMATISM AND COLI BACILLURIA, by E. Hesketh Roberts, F.R.C.S. (Ed.), M.B., B.S. (London); 1929. London: H. K. Lewis and Company, Limited. Demy 8vo., pp. 28, with illustrations. Price: 3s. net.

L'AGRO ROMANO NEL PRIMO QUINQUENNIO FASCISTA: 1928. Roma: Tipografia Cuggiani. Demy 4to., 180.

THE EYE IN GENERAL MEDICINE: THE CONSTITUTIONAL FACTOR IN THE CAUSATION OF DISEASE WITH SPECIAL REFERENCE TO THE TREATMENT OF DISEASES OF THE EYE, by A. Maitland Ramsay, M.D., LL.D.; Second Edition of "Diathesis and Ocular Diseases"; 1929. London: Baillière, Tindall and Cox. Demy 8vo., pp. 265. Price: 12s. 6d. net.

Diary for the Month.

- Nov. 12.—Tasmanian Branch, B.M.A.: Branch.
 Nov. 12.—New South Wales Branch, B.M.A.: Ethics Committee.
 Nov. 13.—Victorian Branch, B.M.A.: Branch.
 Nov. 13.—Central Northern Medical Association, New South Wales.
 Nov. 14.—Victorian Branch, B.M.A.: Council.
 Nov. 14.—New South Wales Branch, B.M.A.: Clinical Meeting.
 Nov. 19.—Tasmanian Branch, B.M.A.: Council.
 Nov. 19.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
 Nov. 19.—New South Wales Branch, B.M.A.: Organization and Science Committee.
 Nov. 20.—Western Australian Branch, B.M.A.: Branch.
 Nov. 20.—Section of Obstetrics and Gynaecology, New South Wales Branch, B.M.A.
 Nov. 22.—Queensland Branch, B.M.A.: Council.
 Nov. 26.—New South Wales Branch, B.M.A.: Medical Politics Committee.
 Nov. 26.—Illawarra Suburbs Medical Association, New South Wales (Annual).
 Nov. 27.—Victorian Branch, B.M.A.: Council.
 Nov. 28.—New South Wales Branch, B.M.A.: Branch.
 Nov. 28.—South Australian Branch, B.M.A.: Branch.
 Dec. 3.—Tasmanian Branch: Council.
 Dec. 3.—New South Wales Branch, B.M.A.: Ethics Committee.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, *locum tenentes* sought, etc., see "Advertiser," page xvi.

CANTERBURY DISTRICT MEMORIAL HOSPITAL: Honorary Vacancies.

CHILDREN'S HOSPITAL, CARLTON, VICTORIA: Clinical Assistant.
 LAUNCESTON PUBLIC HOSPITAL, TASMANIA: Resident Medical Officer (male).

ROYAL HOSPITAL FOR WOMEN, PADDINGTON, NEW SOUTH WALES: Resident Medical Officer.

STATE PUBLIC SERVICE, QUEENSLAND: Health Officer.

THE WOMEN'S HOSPITAL, CROWN STREET, SYDNEY: Resident Medical Officer, Junior Resident Medical Officer.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 21, Elizabeth Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company, Limited. Phoenix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane.	Members accepting appointments as medical officers of country hospitals in Queensland are advised to submit a copy of their agreement to the Council before signing. Brisbane United Friendly Society Institute. Stannary Hills Hospital. Mount Isa Hospital.
SOUTH AUSTRALIAN: Secretary, 207, North Terrace, Adelaide.	All Contract Practice Appointments in South Australia. Booleroo Centre Medical Club.
WESTERN AUSTRALIAN: Honorary Secretary, 65, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.
NEW ZEALAND (WELLINGTON DIVISION): Honorary Secretary, Wellington.	Friendly Society Lodges, Wellington, New Zealand.

Medical practitioners are requested not to apply for appointments to positions at the Hobart General Hospital, Tasmania, without first having communicated with the Editor of THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

All communications should be addressed to "The Editor," THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, Sydney. (Telephones: MW 2651-2.)

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